QUALITY OF WATER

COLORADO RIVER BASIN

PROGRESS REPORT No. 2

JANUARY 1965

UNITED STATES
DEPARTMENT OF THE INTERIOR
Stewart L. Udall, Secretary

T URVEY
Director

BUREAU OF RECLAMATION
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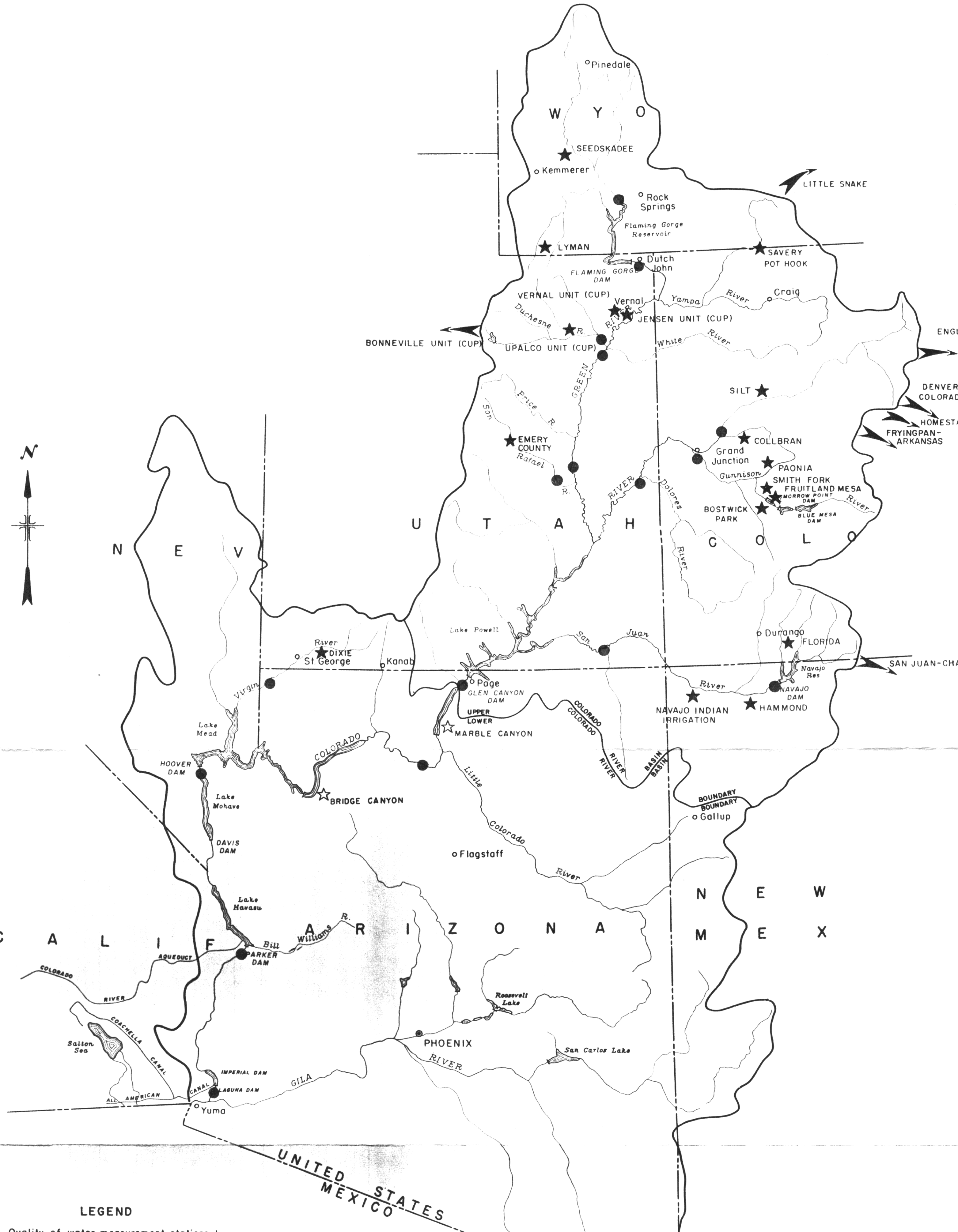

LEGEND

- ● Quality of water measurement stations 1/
- ★ Authorized projects 2/
- ⟵ Transmountain diversions
- ☆ Projects not yet authorized

1/ Data summarized in this report and published annually by Geological Survey

2/ Does not include developments existing prior to authorization of Colorado River Storage Project

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLORADO RIVER BASIN

QUALITY OF WATER MAP

25 0 25 50 75 100 125 150
SCALE OF MILES

65-400-70

JULY 17, 1962
REVISED AUGUST 27, 1964

FIGURE 1

QUALITY OF WATER
COLORADO RIVER BASIN
PROGRESS REPORT

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QUALITY OF WATER
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PROGRESS REPORT

SUMMARY

This report shows the past, the present modified, and the expected uality of water of the Colorado River down to Imperial Dam. The past s represented by a tabulation of the historic condition at seventeen uality of water stations for the 1941-1961 period. The present modiied condition includes adjustments of the historic condition based on he assumption that new developments during the 1941-1961 period were n operation for the full period.

The expected quality condition is an estimate of the quality situaion after the presently authorized developments and some projects conemplated for authorization are placed in operation. The effects of uthorized developments are presented in five different increments.

The studies show that under historic conditions the average concentration of dissolved solids of the Colorado River at Lees Ferry has been 0.74 ton per acre-foot, below Hoover Dam 0.93 ton per acre-foot, and at Imperial Dam 1.00 ton per acre-foot for the 1941-1961 period.

Under present modified conditions, with the recently constructed projects in operation, the concentrations increase to 0.76, 0.96, and 1.06 tons per acre-foot, respectively, at the three stations.

It has been assumed for purposes of this study that the rate of pickup of dissolved solids from new irrigated lands would vary from zero to two tons per acre.

Under the expected condition, with all authorized projects and projects contemplated for authorization in operation and with an assumed pickup of 2 tons per acre on the new irrigated lands, the concentrations are estimated to be 0.90 ton per acre-foot at Lees Ferry, 1.16 tons below Hoover Dam, and 1.36 tons per acre-foot at Imperial Dam.

The average concentration under the expected condition is less than the highest annual average concentration recorded for Lees Ferry in 1954, 1955, 1959, and 1961. The average under the expected condition below Hoover Dam is equal to the high year under present modified conditions with the regulation of Lake Mead in effect, and the average under the expected condition at Imperial Dam is 0.06 ton per acre-foot higher than 1956, the high year under present modified conditions.

PART I. INTRODUCTION

A. Legislative Requirements

Presented herein is the second progress report on Quality of Water in the Colorado River Basin. The first report dated January 1963 was limited principally to the Upper Colorado River Basin while this report includes quality of water data pertaining to the entire river system above Imperial Dam. The authority for preparing these reports is contained in three separate Public Laws. The authorizing legislation for the Colorado River storage project and participating projects, Public Law 485, 84th Congress, Second Session, was signed by the President on April 11, 1956. Section 15 of that Public Law states, "The Secretary of the Interior is directed to continue studies and make a report to the Congress and to the States of the Colorado River Basin on the quality of water of the Colorado River."

A progress report to comply with Public Law 84-485 was in preparation when the authorizing legislation for the San Juan-Chama project and the Navajo Indian Irrigation project (PL 87-483) became effective on June 13, 1962. Section 15 of this act states, "The Secretary of the Interior is directed to continue his studies of the quality of water of the Colorado River system, to appraise its suitability for municipal, domestic, and industrial use and for irrigation in the various areas in the United States in which it is used or proposed to be used, to estimate the effect of additional developments involving its storage and use (whether heretofore authorized or contemplated for authorization) on the remaining water available for use in the United States, to study all possible means of improving the quality of such water and of alleviating the ill effects of water of poor quality, and to report the results of his studies and estimates to the Eighty-seventh Congress and every two years thereafter."

A few weeks later Public Law 590, 87th Congress, Second Session, which authorized the Fryingpan-Arkansas project, was passed, with a similar section pertaining to quality of water reports. This public law, however, stipulated that January 3, 1963, would be the submission date for the initial report and that the reports should be submitted every two years thereafter.

B. Previous Report

The January 1963 report prepared by the Department of the Interior was comprised of two parts: (1) an assessment of the water-quality situation in the part of the Colorado River basin above Lee Ferry, Arizona, as of 1957, prepared by the Geological Survey; and (2) a projection of the water-quality effects to be expected from additional developments that involve storage and irrigation use of river waters above Lee Ferry by the Bureau of Reclamation.

INTRODUCTION

C. Cooperation

This report has been prepared by the Bureau of Reclamation. The Geological Survey contributed considerable basic data and reviewed the technical aspects of the report. A continuing cooperative program between the Bureau of Reclamation and the Survey for the collection of streamflow and quality data and the exchange of information has been in effect for a number of years. This cooperation provides for the collection of data at stations other than those normally maintained by the Survey in order to obtain additional data at key points in the basin. Data collected by the Metropolitan Water District of Southern California have also been included in this report.

D. Scope

This report includes information on quality of water in the Colorado River Basin above Imperial Dam for the calendar years 1941-1961, inclusive. The water-quality situation below Imperial Dam is covered in the February 1963 report titled, "Special Studies--Delivery of Water to Mexico," prepared by the Department of the Interior, Bureau of Reclamation, Region 3. A description of existing projects below Hoover Dam is also included in the special studies report on Delivery of Water to Mexico.

At the time this report was being prepared quality of water data were not generally available beyond September 1962, so the flow and quality tables contained herein are based on data only through December 1961 and are shown by calendar years, except for certain irrigation project studies where data are included through the 1962 irrigation season.

December 1961 is a natural cutoff date between present modified conditions and the beginning of operations on three of the Colorado River storage project units and several of the participating projects. Many of the participating projects along with the storage units are scheduled to begin operations in the 1962 through 1965 period, and actual data will be available for studies to compare with derived values used in the past.

In addition to the 17 stations shown on the map as key stations, quality of water and flow data are obtained by the Geological Survey at a number of other locations in the basin and published annually. Quality data are also collected by the Bureau of Reclamation and other agencies at additional locations for specific project purposes.

Lee Ferry is a point on the Colorado River located one mile downstream from the Paria River confluence and is known as the Compact point. Lees Ferry is the Geological Survey gaging station and quality of water sampling station immediately above the Paria River confluence.

PART II. DESCRIPTION OF BASIN

A. Geology

The upper or northern portion of the Colorado River Basin in Wyoming and Colorado is a mountainous plateau 5,000 to 8,000 feet in elevation marked by broad, rolling valleys, deep canyons, and intersecting mountain ranges. Hundreds of peaks in these mountain chains rise to more than 13,000 feet above sea level and many exceed 14,000 feet in elevation. Mountain lakes exist in considerable numbers. The southern portion of the Upper Basin is studded with rugged mountain peaks interspersed with broad, alluvial valleys and rolling plateaus. The main stream and its tributaries in Colorado generally flow in deep mountain canyons. The Green River, primary tributary of the Colorado River, flows in similar canyons in Wyoming, Colorado, and Utah after rising in the Wind River Mountains. The San Juan River, a large tributary, emerges from the mountains of southwestern Colorado, flows through northwestern New Mexico, and then traverses the deep canyons of the San Juan in Utah before joining the Colorado River in Glen Canyon. The Glen Canyon section of the main stream and tributaries is almost entirely buried in deep canyons.

Rocks of all ages from those of the Archean age (the oldest known geological period) to the recent alluvial deposits, including igneous, sedimentary, and metamorphic types, are found in the Colorado River Basin. The high Rocky Mountains which dominate the topography of the upper regions are composed of granites, schists, gneisses, lava, and sharply folded sedimentary rocks of limestone, sandstone, and shale. Many periods of deposition, erosion, and upheaval have played a part in the present structure of these mountains.

In contrast to the folded rocks of the mountains which fringe the basin, the plateau country of southwestern Wyoming, eastern Utah, and northern Arizona is composed principally of horizontal strata of sedimentary rocks. Slow but constant elevation of the land area has allowed the Colorado River and its tributaries to cut narrow, deep canyons into the flat-topped mesas. This type of erosion reaches its culmination in the Grand Canyon where the Colorado River has cut through all of the sedimentary rocks down to the oldest Archean granites.

The Lower Basin is characterized by broad, flat valleys separated by low ranges. These valleys are filled by large accumulations of alluvial deposits.

Silt removed by constant erosion of the upper areas was deposited and now forms the great delta of the Colorado River in Arizona, California, and Mexico.

The new reservoirs recently constructed or under construction above Lees Ferry (Lake Powell, Flaming Gorge, Navajo, Morrow Point, and Blue Mesa), together with Lake Mead downstream, have resulted in some major changes in the stream regimen: (1) the stream channels subject to inundation by these reservoirs will no longer be subjected to natural stream erosion, (2) the accumulation of sediment within the reservoirs slows the growth and flooding of the Colorado River delta, (3) flooding has diminished in many areas, and (4) sections of sediment-laden streams have given way to clear water streams and lakes.

The mineral concentration in runoff increases from the headwater areas downstream and occurs in relation to the geologic character of the terrain across which the Colorado River and its tributaries flow. The geologic formations that largely contribute to the mineral concentrations in natural runoff are evaporites of Paleozoic age, shale of Cretaceous age, and salt and gypsum of Tertiary age.

B. Soils

The soils of the Colorado River Basin closely resemble the geologic formations of their origin. Only in limited areas at the higher elevations has the precipitation leached the soil mass of its soluble constituents. Over most of the area both residual and transported soils are basic in reaction and well supplied with carbonates with normal or mature soils exhibiting a distinct horizon of carbonate accumulation. The impress of soil-forming factors has resulted in the widespread development of soils classified as members of the Gray-Desert Great Soil Group. In areas with higher rainfall, soils of the Brown and Chestnut Great Soil Groups have developed. Saline and alkali (sodic) soils occur in many parts of the basin.

The residual soils comprise the larger area and are usually shallow in depth over shale and sandstone of various ages. Many of the shales are saline but contain much gypsum as well as other chloride and sulphate salts. Some formations are high in sodium chloride and some have sodium carbonate or bicarbonate strata. Very few residual soil areas are suitable for irrigation development.

The alluvial materials are extremely variable and range from alluvial fans and terraces, outwash plains, to lacustrine sediments. Some areas have soils from material transported only short distances and resemble the original materials. Other areas have soils which have been transported and mixed extremely well. Most of the agricultural areas are on these well-mixed alluviums and, therefore, the soils are quite variable.

Extensive areas of Eolian deposits occur in parts of the basin, principally southwestern Colorado. These uniformly textured soils are reddish brown in color and have no resemblance to either the underlying formations or adjacent areas. These are excellent agricultural soils, but in many areas topography makes agriculture difficult.

C. Climate

The Colorado River Basin has climatic extremes, ranging between year-round snow cover and heavy precipitation on the high peaks of the Rocky Mountains to desert conditions with very little rain in the southern part of the basin. This wide range of climate is caused by differences in altitude, latitude, and by the configuration of the high mountain ranges. The encircling mountain ranges obstruct and deflect the air masses to such an extent that storm patterns are more erratic than in most other parts of the United States. Most of the moisture for precipitation on the Upper Basin is derived from the Pacific Ocean and the Gulf of Mexico. The Pacific source predominates generally from October through April and the Gulf source during the late spring and early summer.

In the northern part of the basin most precipitation falls in the form of winter snows and spring rains. Summer storms are infrequent but are sometimes of cloudburst intensity in localized areas. In the more arid southern portion the principal rainy season is in the winter months with occasional localized cloudbursts in the summer and fall.

Extremes of temperature in the basin range from 50° below zero to 130° above zero. The northern portion of the basin is characterized by short, warm summers and long, cold winters, and many mountain areas are blanketed by deep snow all winter. The southern portion of the basin has long, hot summers, practically continuous sunshine, and almost complete absence of freezing temperatures.

Nevertheless, the entire basin is arid except in the extremely high altitudes of the headwaters areas. Rainfall averages as low as 2.5 inches in the southern end of the basin while total precipitation in the high mountains may range from 40 to 60 inches annually.

D. Vegetation

Areas of higher elevation are covered with forests of pine, fir, spruce, and silver-stemmed aspens, broken by small glades and mountain meadows. Pinon and juniper trees, interspersed with scrub oak, mountain mahogany, rabbit brush, bunch grasses, and similar plants grow in the intermediate elevations of the mesa and plateau regions. Large areas in the Upper Basin are dominated by big sagebrush and related vegetation. Many of the streams are bordered by cottonwoods, willows, and salt cedar. Scattered cottonwoods and chokecherries grow in the canyons with the cliff rose, the redbud, and blue columbine. A profusion of wildflowers carpets many mountain parks. At lower elevations large areas are almost completely devoid of plant life while other sections are sprinkled with desert shrubs, Joshua trees, other Yucca plants, and saguaro cacti, some of the latter giant plants reaching 40 feet in height. Occasionally, cottonwoods or desert willows are found along desert streams with mesquite and creosote bush or catclaw and paloverde. In recent years many river channels have been overrun with tamarix or salt cedar to the extent that a large volume of water is being consumed by such vegetation. Measures are being taken to curb the growth of phreatophytes to conserve water.

E. Hydrology

The Colorado River rises among lofty peaks more than 14,000 feet high in the northwest portion of Colorado's Rocky Mountain National Park, 70 miles northwest of Denver. It meanders southwest for 640 miles through the Upper Basin to Lee Ferry. The Green River, its major tributary, rises in western Wyoming and discharges into the Colorado River in southeastern Utah--730 river miles south of its origin and 220 miles above Lee Ferry. The Green River drains 70 percent more area than the Colorado River above their junction but produces only about three-fourths as much water. The Gunnison and the San Juan are the other principal tributaries of the upper Colorado River.

The flows of the San Juan River are now controlled by the Navajo Dam, the Green River by Flaming Gorge Dam, and when the Curecanti Unit Dams are completed, the flows of the Gunnison will be largely controlled. Glen Canyon Dam is the only major dam on the main stem of the Colorado above Lee Ferry, but it will permit control of all flows leaving the Upper Basin.

The flow of the various streams in the Upper Colorado River Basin for the 1941-1961 period is given in Tables 1 through 12. The records of flow depict the characteristic wide fluctuations from month to month and the considerable variation from year to year. The recently constructed storage reservoirs will now level out some of these fluctuations.

The natural drainage area of the lower Colorado River below Lee Ferry and above Imperial Dam is about 75,100 square miles. This section of the river is now largely controlled by a series of storage and diversion dams starting with Hoover Dam and ending at Imperial Dam.

At the present time there is no significant storage on the main river or on the tributaries between Glen Canyon Dam and Lake Mead. The intervening tributary inflow is erratic but amounts to almost enough to offset the evaporation from Lake Mead.

Lake Mead provides most of the storage and regulation in the Lower Colorado River Basin with the water being stored for irrigation and municipal and industrial uses, generation of electrical power, and other beneficial uses.

DESCRIPTION OF BASIN

Lake Mohave, the reservoir formed by Davis Dam, backs water at high stages about 67 miles upstream to the tailrace of Hoover Powerplant. Storage in Lake Mohave is used for some reregulation of releases from Hoover Dam, for meeting treaty requirements with Mexico, and for developing power head for the production of electrical energy at Davis Powerplant.

The river flows through a natural channel for about 10 miles below Davis Dam, at which point the river enters the broad Mohave valley 33 miles above the upper end of Lake Havasu.

Lake Havasu backs up behind Parker Dam for about 45 miles and covers about 25,000 acres. A forebay was constructed in Lake Havasu from which the Metropolitan Water District of Southern California pumps water into the Colorado River Aqueduct. Lake Havasu also controls floods originating below Davis Dam.

Headgate Rock Dam, Palo Verde Diversion Dam, and Imperial Dam all serve as diversion structures with practically no storage. Imperial Dam, located some 150 miles downstream from Parker Dam, is the major diversion structure to irrigation projects in the Imperial Valley and Yuma areas. It diverts water on the right bank to the All-American Canal which delivers water to the Yuma project in Arizona and California and Imperial and Coachella Valleys in California.It diverts on the left bank to the Gila Gravity Main Canal. Tables No. 13 through No. 17 include data on stations in the lower basin.

PART III. HISTORY OF DEVELOPMENT

A. Acres Irrigated Prior to Colorado River Storage Project Authorization

A study of the irrigated acreage in the Upper Basin shows that about 800,000 acres were irrigated by 1905. Irrigation development took place gradually from the beginning of settlement about 1860, but was hastened by the purchase of land from the Indians in 1873. Between 1905 and 1920 the development of irrigated land continued at a rapid pace, and by 1920 nearly 1,400,000 acres were irrigated. Then the development leveled off and there has been very little increase since that time. The 1929 and 1939 agriculture censuses show a little over 1,400,000 acres irrigated, with the 1949 and 1959 censuses recording a little under that amount.

The lack of further increase in irrigated acreage in the Upper Basin is ascribed to both physical and economic limitations in the availability of water. By 1920 most of the lower cost and more easily constructed developments were in operation, and, although some new developments have taken place since that time, they have been offset by other acreages going out of production.

A large acreage is irrigated in the Lower Basin below Imperial Dam, but only the principal areas above Imperial Dam are discussed in this report. Studies of irrigated acreages within the Lower Basin show about 12,000 acres irrigated in Nevada and 23,500 acres in Utah, including 9,500 acres presently irrigated in the Dixie project area.

Irrigation began in the Palo Verde area in 1879 and was expanded between 1905 and 1908 by construction of an intake structure and gravity canal. A new diversion structure was completed in 1957 allowing the irrigated acreage to be increased to 77,500 acres in 1961.

Irrigation on the Colorado River Indian Reservation was first attempted in 1870, but failure of the headgate structure resulted in flooding sections of the valley. Other difficulties were encountered, and by 1936 only 5,000 acres were actually irrigated. With completion of a new diversion structure in 1942 the acreage has steadily increased so that about 30,000 acres are now irrigated.

B. Depletions

During the period of record examined in detail in this report (1941-1961), the average yearly consumptive use of water within the Upper Basin is estimated to be about 1,685,000 acre-feet. This is low compared with the irrigated acreage, but some lands do not have a full supply. No accurate determination can be made of the actual amount of water consumed because not all of the diverted water is gaged and practically none of the return flow is measured.

As water exported from the Upper Basin during the same period averages about 315,000 acre-feet, the estimated average Upper Basin consumptive use was about 2 million acre-feet per year. Since completion of the Colorado-Big Thompson project with initial diversions made in year 1947, the transmountain diversions have increased to around 450,000 acre-feet. Yearly increases or decreases in reservoir content affect annual depletions from the Colorado River, but these changes have little effect on average depletions. Essentially all surface water available for use in the Lower Basin is now appropriated. The additional development of lands for irrigation in new areas necessarily will be limited to small areas on tributaries to be supplied by the conservation of flood waters; the development of groundwater; adjustments in present water uses; and the salvage, where feasible, of present losses.

C. Water Compacts and Treaties

1. Colorado River Compact

Water of the Colorado River was divided between the Upper and Lower Colorado River Basins by the Colorado River Compact which was signed in 1922 by a commissioner of each of the seven States of the river basin and by a representative of the United States. The dividing point on the river between the Upper and Lower Basins is at Lee Ferry, which is defined as a point one mile below the mouth of the Paria River. The compact apportions to each of the Upper and Lower Basins in perpetuity for exclusive beneficial use a total of 7,500,000 acre-feet annually. In addition to the apportionment of 7,500,000 acre-feet, the Lower Basin is given the right to increase its beneficial consumptive use of water from the Colorado River system by 1,000,000 acre-feet annually. The compact further provides that the States of the upper division will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75 million acre-feet for any period of ten consecutive years.

One provision in the compact permits exportation of the water out of the basin as long as it is used beneficially in the seven basin States and another provision recognizes the obligations of the United States to the Indian tribes. The compact prescribes the manner in which the waters of the Colorado River system may be made available to Mexico under any water rights recognized by the United States.

The compact, in effect, cleared the way for legislation authorizing the construction of major projects such as Boulder Canyon project, and it also cleared the way for compacts or agreements within the Upper and Lower Basins to further divide the water among the States.

2. Mexican Treaty

The treaty with Mexico, signed in 1944, provides basically for an annual delivery by the United States to Mexico of 1,500,000 acre-feet of Colorado River water.

3. Upper Colorado River Basin Compact

With the water allocated to the Upper Basin by the Colorado River Compact and with the Mexican Treaty signed, the Upper Basin States began negotiations which resulted in the signing of the Upper Colorado River Basin Compact in 1948. Under the terms of the compact, Arizona is permitted to use 50,000 acre-feet of water annually from the upper Colorado River system, and the remaining water is apportioned to the other Upper Basin States in the following percentages:

State of Colorado	51.75 percent
State of New Mexico	11.25 percent
State of Utah	23.00 percent
State of Wyoming	14.00 percent

Congress had previously been unwilling to approve projects without assurance that a water supply would be available, so this division of water among the States permitted development in the Upper Basin to proceed and resulted primarily in the authorization of most of the Federal projects above Lee Ferry that are mentioned in this report.

Neither of the compacts specifically mention water quality, but it has been recognized since as a factor to be considered in developing projects, and water quality studies have been required by recent legislation authorizing the construction of projects in the Upper Basin.

4. Arizona v. California suit in the Supreme Court

The States of the Lower Basin have never agreed to a compact for the division of the use of the waters of the Lower Colorado River Basin. The State of Arizona filed suit in the Supreme Court of the United States in October 1952 against the State of California and others for the determination of the rights to use the waters of the Lower Colorado River system. The Supreme Court gave its decision on June 3, 1963, and issued a decree on March 9, 1964, providing for the apportionment of the use of the waters of the main stream of the Colorado River below Lee Ferry among the States of Arizona, California, and Nevada. The States of Arizona and New Mexico were granted the exclusive use of the waters of the Gila River system in the United States. The decree did not affect the rights or priorities to the use of water in any of the other Lower Basin tributaries of the Colorado River.

The decree permits the States of the Lower Basin to now proceed with developments to use their apportionments of Colorado River water. Major new developments would be the Southern Nevada Water Supply Project in Nevada, the Dixie Project in Utah, and the Central Arizona Project in Arizona.

D. Economic Conditions

The prosperity of agriculture in the upper Colorado River drainage basin generally parallels the prosperity of the livestock industry. With vast areas of fine range land available for summer grazing, livestock production is limited by the production of hay for winter feed.

Intensified development of mineral resources in recent years has created new employment opportunities, including off-the-farm work for many farmers. The most extensive and commercially important mineral resources of the basin are coal, oil, and natural gas. The Upper Basin is also the leading domestic source of vanadium, uranium, and radium ore, and molybdenum. Copper, zinc, lead, silver, and gold are also commercially important. The increase in population resulting from new job opportunities has created new markets for locally produced and imported products, has taxed municipal facilities and water supplies in several areas, and has increased demands for electricity. Raw materials are stimulating industrial activities in areas adjoining the upper drainage basin, particularly areas near Denver, Pueblo, Provo, and Salt Lake City. These adjoining areas all import water from the Colorado River Basin and without the imported water their economic growth would be limited.

Tourism as an industry has increased significantly in recent years because of the many natural attractions. Manufacturing as a basic industry is of relatively minor importance in the Upper Basin.

Irrigated areas in the Lower Colorado River Basin using Colorado River water are highly productive and the agricultural operations very intensified. Gross crop values per acre probably are greater than any other area of comparable size in the world. For the 1963 crop year, approximately 749,200 acres of irrigated land in the Lower Colorado River Basin were provided a full water supply from the Colorado River and produced a total gross crop income of about $261,753,000. This gives an average gross crop income of $349.00 per acre.

The Pacific Southwest is one of the most rapidly developing areas in the nation, both industrially and population-wise. Colorado River water for municipal and industrial purposes is supplied to approximately 109 incorporated areas and other communities in this area. This water supply ranges from a minor supplemental supply for some entities to a complete supply for others.

HISTORY OF DEVELOPMENT

During 1963 approximately 1,100,000 acre-feet of Colorado River water was supplied to incorporated areas and other communities primarily for municipal and industrial purposes. This water supply served a population of about 8,396,000 people.

PART IV. AUTHORIZED DEVELOPMENT

A. Acres to be Developed

About 212,000 acres of new land to be irrigated within the Upper Colorado River Basin under the recently authorized projects considered in this report represent an increase of about 15 percent over the previously irrigated area. Approximately 70 percent of this increase is included in two projects--the Seedskadee project in Wyoming and the Navajo Indian Irrigation project in New Mexico. The remainder consists of new acreages that have been or will be added to presently irrigated areas as a firm water supply becomes available by means of storage or other newly constructed facilities.

The only new lands which have been authorized for development in the Lower Colorado River Basin above Imperial Dam are lands within the Colorado River Indian Reservation below Parker, Arizona. One hundred and eight thousand (108,000) acres of land on this reservation is reported to be planned for development. Present development is about 30,000 acres. Because the time schedule for development of these lands is uncertain, they have not been considered in estimates for this report.

The Dixie project in Utah, recently authorized, would add 11,615 acres of new land to the presently irrigated area of 9,445 acres in the Virgin River Basin.

B. Depletions on New Projects

The anticipated new depletions of water from Federal projects recently authorized and other miscellaneous projects are indicated in Table No. 19. The 649,000-acre-feet depletion resulting from reservoir losses (Increment No. 1) will occur gradually as the reservoirs fill, with the full depletion dependent primarily upon the time required for filling Lake Powell. Of the remaining 1,390,000 acre-feet of depletions tabulated, it is estimated that about 800,000 acre-feet will be depleted by 1975 with the remainder occurring gradually during the next 10 to 15 years.

The new depletions include 602,000 acre-feet of transmountain diversions.

The Dixie project will deplete the Virgin River basin by 62,000 acre-feet, including 8,300 acre-feet for a municipal supply for Cedar City, Utah.

C. Economic Impact

The impact of the authorized storage units and participating projects on the economy of the Upper Basin is highly significant and increasingly evident as construction work proceeds and reservoirs are formed which provide water for irrigation, municipal and industrial uses, power production, and recreational opportunities. Approximately $500 million has already been spent on construction out of an estimated $1.3 billion. The economic impact of this expenditure has been widespread as equipment, materials, and labor have been acquired from throughout the nation and foreign countries. Especially significant is employment in the vicinity of construction. Two new permanent communities (Page, Arizona, and Dutch John, Utah,) have been established for construction and operation of the storage units.

The irrigation water supply used by the participating projects is estimated to total 1.4 million acre-feet annually. Net farm income from use of this water on 350,000 acres of land already partly irrigated and 310,000 acres of new land including lands served by transmountain diversions is estimated to increase $30 million annually. This farm income will help stabilize the local economy and will create an equal amount of nonfarm income.

About 190,000 acre-feet of water for municipal and industrial uses will be provided by the participating projects. This is enough water to supply the needs of approximately 3/4 of a million persons, including the needs of the municipalities, businesses, and industries which serve and support them.

Hydroelectric power produced at the storage units and participating projects will amount to approximately 5.6 billion kilowatt-hours annually, adding over one-third to the installed electric powerplant capacity and energy output in the Upper Basin States. Put another way, the added power will approximately equal the 1962 electric power consumption in New Mexico and Wyoming.

Outdoor recreation provided by the many reservoirs in boating, fishing, etc., is already running close to one million visitor days annually and is expected to at least triple when all of the reservoirs are completed.

Water holds the key position in the development of the arid Upper Basin. The area is a treasure house of natural resources, such as coal, phosphate, oil and gas, oil shale, potash, and others. Water and power will permit the continued development and utilization of these varied and many resources.

AUTHORIZED DEVELOPMENT

Water from the Dixie project will improve and stabilize economic conditions in southwestern Utah, and electrical energy from the potential Marble Canyon and Bridge Canyon projects will further enhance economic conditions in the rapidly growing southwest area.

PART V. BASIC STUDIES

A. Procedures

Studies of past and future effects of storage and irrigation projects on the quality of water downstream depend primarily on records of streamflow and quality of water collected before the project was constructed as well as afterward. Many projects were built before the need for antecedent data was recognized, and as a result data adequately defining the effects of existing projects are rare.

The primary requisites for a comprehensive quality of water study of an irrigated area are inflow and outflow measurements of both quantity and quality of water. Each gaging station and quality sampling site is expensive to install and maintain, so with limited funds available care must be exercised in the selection of special study areas. If gaging stations are already in operation, these are used with the addition of quality sampling. If gaging stations do not exist, funds are advanced to the Geological Survey through a cooperative program to install and maintain stations and to collect and analyze the water samples.

A meaningful study should be based on a period of at least four to ten years on the smaller or well-defined basin areas with the length of period partly dependent on how stable the irrigation practices are. It must be recognized that each area will have a different effect on water quality. To reflect the effect of continuing development in larger basins, studies will need to be continued for a long period.

So far the studies in the basin have been limited to a comparison of the total dissolved solids in the inflowing water and the return flow water. No attempt has been made to determine water and total dissolved solids, losses by deep percolation, to detect underground aquifers that might be augmented with return flow, or to evaluate changes in chemical characteristics (other than dissolved solids) resulting from development.

Studies prior to irrigation would be helpful, but they have not been made in most areas, so comparisons must be made when new land is added or new storage is made available. A study is planned for the Seedskadee project area at a later date. This will give a clear-cut comparison between "before" and "after" irrigation conditions since no land is presently irrigated on the Seedskadee project.

Under favorable salt balance conditions, an amount equal to or greater than the amount of dissolved solids carried to the land by irrigation water is assumed to be carried off the land by irrigation return flows. The term "pickup of dissolved solids from irrigated lands" as used in this report applies to dissolved solids picked up in addition to favorable salt balance conditions.

Studies conducted thus far indicate that there is much variation in the amount of pickup from irrigated land. For comparison the analyses in this report are based on values of zero and two tons per acre pickup from new irrigated land. The results of both analyses are shown in Table No. 18. No additional pickup is assumed from supplemental irrigation.

B. Streamflow and Quality of Water Measuring Stations

The study period for the 1963 report was from 1941 through 1958, inclusive; the period for the 1965 report has been extended an additional three years through 1961. Both flow and quality records are available for this extended period. The Green River, Wyoming, station has been added to show the effects of upstream developments and to better define the quality of water entering Flaming Gorge Reservoir. This Green River station is in a good location to measure the effect future development of the Seedskadee project will have on quality of water in the Green River.

Quality of water and flow records are generally available for the 17 stations selected for this study of the Colorado River Basin. When records were not available, they were developed by corollary studies from which data for the periods of missing records were estimated.

Figure No. 1, as well as the following descriptions, summarizes records for the period of study. Basic records used in this report were selected from those obtained by the Geological Survey under a continuing program for collection of water records. Part of the data collection program is supported by funds transferred by the Bureau of Reclamation to the Geological Survey.

To simplify tabulation, monthly values of flow and total dissolved solids have been rounded to the nearest 1,000 except for concentration values. This rounding resulted in some differences between the recorded and the computed monthly concentrations when the flows were often near or below 1,000 acre-feet and the loads below 1,000 tons. For example, in the San Rafael and Duchesne drainages some of the late summer flows are less than 1,000 acre-feet per month; hence, some monthly values of concentration shown in the tables differ from those actually recorded because of the method of rounding; nevertheless, the annual concentrations are unaffected. Similarly, minor differences from published data in monthly concentrations occur in isolated instances in the flow and quality tables for the other stations.

A brief resume of the source and method of derivation for each of the records shown on Figure No. 1 and in Tables No. 1 to No. 17, inclusive, follows:

Stations with complete records

Records of flow and water quality are available for nearly all of the 1941-61 period for the Green River at Green River, Utah (Table No. 5); for the Colorado River near Cameo, Colorado (Table No. 7); Gunnison River near Grand Junction, Colorado (Table No. 8); Colorado River near Cisco, Utah (Table No. 9); and San Juan River near Bluff, Utah (Table No. 11). Minor extensions only were needed to fill in short periods of records for a few of these stations.

Green River near Green River, Wyoming

Flow records are available at this station from April 1951 and quality records from March 1951. The records have been extended back to 1941 by correlation with nearby stations.

Green River near Greendale, Utah, and near Ouray, Utah

Flow measurements or comparable data are available for the Green River near Greendale (Table No. 2), but chemical quality of water measurements are available only for the years 1957 through 1961, inclusive. Flow measurements near Ouray, Utah, (Table No. 4) are available for the 1948-61 period, but quality records are limited to the years 1951, 1952, and 1957 through 1961. Extensive correlations with other available records on the Green River system were employed to develop the estimates shown herein for both streamflow and dissolved solids.

Duchesne River near Randlett, Utah

Flow records have been obtained continuously since 1943 and quality data are available for 1951 and 1957 through 1961 (Table No. 3). Correlations with other stations in the Duchesne River system were employed to estimate the data for the missing periods.

San Juan River near Archuleta, New Mexico

Flow and quality load data presented are a combination of measurements obtained near Archuleta and at Blanco, New Mexico, with some adjustments and correlations for the period 1945-61 (Table No. 10). Correlations were employed to estimate the data for 1941-45.

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San Rafael River near Green River, Utah

Correlations were used to estimate flow at this gage from 1941 to 1945 after which measurements of flow were taken (Table No. 6). Quality sampling was begun in 1946 and is complete for the remainder of the study period except for 1950. Extensions of available data provided satisfactory estimates of the quality load for the missing years.

Colorado River at Lees Ferry, Arizona

This station has complete flow records available for the study period but lacks quality of water measurements for 1941, 1942, 1946, and 1947 (Table No. 12). Load data for these years were estimated by extensive multiple correlations using data for the Colorado River near Cisco, Utah, and near Grand Canyon, Arizona; the Green River at Green River, Utah; and the San Juan River near Bluff, Utah, as well as the Lees Ferry record.

Colorado River near Grand Canyon, Arizona

Discharge measurements are available for the period of study and chemical quality records are available except for the period December 1942 to August 1943 (Table No. 13). Loads for the periods of missing records were estimated from records at upstream stations.

Virgin River at Littlefield, Arizona

Discharge measurements were obtained for the study period but quality data are available only from July 1949 to December 1961. Detailed correlations were employed to estimate the data for the missing period (Table No. 14).

Colorado River below Hoover Dam, Arizona-Nevada

Discharge and quality records are available for the 1941-61 period (Table No. 15) to present, except for the period November 1944 to September 1950 when these quality data are based on specific conductance analyses only for intermittent intervals (Table No. 15).

Colorado River below Parker Dam, Arizona-California

Discharge measurements for the study period are included in records of the Geological Survey. Quality data have been obtained since July 1941 by the Metropolitan Water District of Southern California at the Lake Havasu Intake Pumping Plant and are published in its Report No. 815 dated November 1963. The six months of missing record were obtained by correlation (Table No. 16).

Colorado River at Imperial Dam, Arizona-California

Discharge figures are available for the study period. Those from October 1942 through September 1960 are based on the combined records of discharge obtained at gaging stations on Colorado River at Yuma, All-American Canal near Imperial Dam, Gila Gravity Main Canal at Imperial Dam, Yuma Main Canal at Laguna Dam, and North Gila Valley Canal at Laguna Dam less that of Gila River near Dome, Arizona. Records after September 1960 are based on the combined daily discharge of Colorado River passing Imperial Dam and at gaging stations on All-American Canal near Imperial Dam and Gila Gravity Main Canal at Imperial Dam.

Quality data for the period January 1941 to 1943 were obtained from the U. S. Department of Agriculture salinity laboratory at Riverside, California, and the remainder, 1943 to 1961, were obtained from U.S. Geological Survey Water Supply papers and provisional records and are based on data for the Yuma Main Canal below the Colorado River siphon (Table No. 17).

C. Analyses

Published quality of water records consist of a combination of stream discharges with chemical analyses of stream water samples collected at more or less regular intervals. The reliability of the records depends on the accuracy of the streamflow records, the frequency of collection and representativeness of the samples, the stability of the samples during the storage periods prior to the making of the analyses, the completeness and accuracy of the individual analyses, and the manner in which the individual samples are combined before analysis to represent increments of stream discharge.

Most of the water analyses forming the basic data for the chemical records in this report were made in the laboratories of the Geological Survey at Washington, D. C., Albuquerque, New Mexico, and Salt Lake City, Utah, using standard procedures, by chemists specifically trained in water analysis. During the 21-year period considered there were numerous changes in laboratory techniques and procedures, mostly due to introduction of new instrumental methods. New procedures were adopted only after careful investigation to insure results consistent with those obtained previously. Some of the quality of water records are based on analysis of samples by Bureau of Reclamation laboratories. Bureau of Reclamation results and methods have been checked by the Geological Survey to insure comparable records. Analyses by the Metropolitan Water District have been made by standardized procedures and appear to be comparable with analyses by the Geological Survey. It is probable that errors in the load computations due to errors in the analyses are less than those due to changes in the samples upon storage,inaccuracies in sampling, or inaccuracies in the determination of stream discharges.

D. Special Studies

Special quality of water studies have been made in a number of irrigated areas to determine storage and irrigation effects on water quality. Sufficient quality data have been collected by the Bureau of Reclamation in three of these areas to indicate the trend under varying conditions.

1. Eden project

The first of these is the Eden project in Wyoming where collection of data began before the Colorado River Storage Project Act was passed in 1956. Data are available for the eight years 1955-1962 which cover most of the development period. The dissolved solids pickup during the early years of operation was high but decreased thereafter. It is believed significant that the pickup remained essentially the same through 1960, 1961, and 1962, although over twice as much water was available for irrigation in 1962 as in 1960 or 1961. It now appears that the initial heavy leaching is over and that a rate of pickup of dissolved solids lower than observed in the 1955 to 1959 period can be expected in the future.

The results of this study, shown in the table on page 24, involve some complications. Some water loss in addition to the water consumptively used by crops occurs in the irrigated area and between the irrigated area and the measuring point on Big Sandy Creek. For example, some water is consumed by nonbeneficial vegetation. The pickup of salts from the irrigate land would undoubtedly be greater if this additional water loss were included. On the other hand, because of the location of the measuring points, some natural pickup from nonirrigated areas is included, tending to compensate for some of the additional water and salt loss.

Collection of data will continue for a few years to further determine the trend in salt pickup and whether possible errors in quality or flow measurements have unduly influenced the conclusions.

The Eden project has had a long history of drainage distress with a resultant salt accumulation. The construction of drains relieved this situation and caused the dissolved solids accumulation to leach into the streams. The values by years for the eight-year period are tabulated on the following page.

Eden Project

Year	Ac.-ft. or tons	Total inflow	Total outflow	Differ-ence	Acres	Tons/ acre
1955	A.F.	53,400	19,700	33,700		
	Tons	11,300	56,800	45,500	8,700	5.2
1956	A.F.	67,800	21,100	46,700		
	Tons	19,200	61,600	42,400	8,600	5.0
1957	A.F.	77,600	44,900	32,700		
	Tons	16,900	85,900	69,000	10,500	6.6
1958	A.F.	78,900	37,500	41,400		
	Tons	15,900	87,700	71,800	12,900	5.6
1959	A.F.	44,600	15,800	28,800		
	Tons	9,700	60,300	50,600	13,000	3.9
1960	A.F.	34,900	11,100	23,800		
	Tons	10,100	40,700	30,600	12,700	2.4
1961	A.F.	34,000	8,200	25,800		
	Tons	8,700	32,500	23,800	12,000	2.0
1962	A.F.	81,000	26,500	54,500		
	Tons	20,900	48,900	28,000	14,100	2.0

2. LaPlata River Study

A quality of water study has been made of privately irrigated lands in the LaPlata River drainage, located in southwestern Colorado and northwestern New Mexico. The LaPlata River is tributary to the San Juan River, a few miles below Farmington, New Mexico. There is very little storage of water, and the lands are subject to irrigation with natural runoff, with flows high during the spring and low after midsummer. Under these conditions more water is applied than necessary early in the season and shortages are the rule in the late irrigation season. Therefore, the pickup in tons per acre, as noted in the table, is low because the area does not have a full water supply and because the full acreage has been used in the computations.

Quality has been studied at three locations in the LaPlata drainage--Hesperus, State Line, and Farmington. The results given are averages for the 1941-1960 period. Some correlations were necessary to extend the data over the full period.

LaPlata River between Hesperus and Colorado-New Mexico State line

Ac.-ft. or tons	Inflow	Outflow	Differ-ence	Acres irrigated	Tons/ acre
Acre-feet	33,000	26,000	7,000		
Tons	4,000	14,000	10,000	15,000	0.67

LaPlata River between State Line and Farmington

Ac.-ft. or tons	Inflow	Outflow	Difference	Acres irrigated	Tons/acre
Acre-feet	26,000	22,000	4,000		
Tons	14,000	23,000	9,000	9,000	1.00

Lands in the lower LaPlata drainage area have a high potential for salt pickup and the average concentration is a little over one ton per acre-foot (23,000 tons ÷ 22,000 acre-feet) at Farmington, whereas the average concentration at the State Line is 0.54 ton per acre-foot (14,000 tons ÷ 26,000 acre-feet).

To estimate the effect on the LaPlata area of importing 225,000 acre-feet annually from the Animas River, a hypothetical operation study of the potential Animas-LaPlata project was made for the 1941-1956 period. A pickup of 1.5 tons per acre was assumed and the resulting average annual T.D.S. concentration in the LaPlata River near Farmington varied from 0.87 to 1.48 tons per acre-foot. It appears that full project development would not create a quality problem in the San Juan River.

Sampling and studies in this particular area will not be resumed until there are additional significant developments in the LaPlata area.

3. Florida Project

Construction of the Florida project is now nearing completion. The Lemon Reservoir on Florida River will regulate the flow of the river for irrigation of 19,450 acres of land including 5,730 acres not previously irrigated and 13,720 acres in need of supplemental water.

In order to obtain quality information under preproject conditions, flow and quality data were collected at several points in the Florida project area beginning in 1958. A study has been made of these data for the period 1958-1962 to show the effect that irrigation of these lands has on the quality of return flows leaving the project under the condition of no storage. Data to be collected subsequently will reflect project conditions including storage, and an operating period of about 5 years will be necessary before the results of project operation will have enough effect to warrant another study.

An attempt was made in this study to measure the effect of irrigation in the Florida area on the quality of water in the Animas River below its confluence with the Florida River. It was found that the difference in concentration however is scarcely discernible and is not within the accuracy of measurement of either flow or quality.

BASIC STUDIES

Florida Project, Colorado

Year	Ac.-ft. or tons	Inflow	Outflow	Difference	Pickup tons/acre	Loss tons/acre
1958	A.F.	99,800	90,360	9,440		
	Tons	14,315	15,470	+1,155	0.08	
1959	A.F.	28,260	14,300	13,960		
	Tons	4,900	4,365	525		0.04
1960	A.F.	73,130	60,600	12,530		
	Tons	10,600	11,730	+1,130	0.08	
1961	A.F.	58,490	41,430	17,060		
	Tons	9,100	8,970	130		0.01
1962	A.F.	67,070	48,470	18,600		
	Tons	10,220	10,220	0	0	

From the above tabulation it is apparent that there has been a very small amount of pickup. The concentration of total dissolved solids in the inflowing water ranges from 0.14 to 0.17 ton per acre-foot, and that of the outflowing water ranges from 0.17 to 0.30. About 13,720 acres were irrigated prior to construction of the project facilities.

As in the LaPlata study, the full irrigable acreage was used in computing the pickup in tons per acre, even though some land has had a limited supply of irrigation water; therefore, the apparent losses of salt and the extremely low pickup may be due to lack of sufficient water to insure leaching.

Irrigation has been practiced for many years in the Florida area without adverse effects because of the extremely good water and the good drainage conditions.

The Florida project soils and the adjoining Pine River project soils are naturally low in salinity and alkalinity, and the amount of dissolved solids removed from these projects is about equal to the amount deposited.

Very little increase in T.D.S. pickup is expected when the expanded project goes into full operation. The collection of quality and streamflow data will be discontinued for a few years on the Florida project. Then collection of data will be resumed and another study made to determine the effect of the increased water supply and the irrigation of new lands.

The studies described above afford some support for the assumptions set forth earlier in the report that a pickup range from 0 to 2 tons per acre is indicated for irrigated acreages after the initial leaching. The pickup on the Florida project is about one tenth ton per acre, and that on the Eden project may average about 2 tons per acre after further leaching.

BASIC STUDIES

Considerable variation in the effects of irrigation return flow on water quality is to be expected. Differences arise due to the size of the irrigated areas, the number of times the return flow is reused, properties of the soils and drainage area, number of years land has been irrigated, nature of aquifers, rainfall, dilution, temperature, irrigation methods, storage reservoirs, vegetation, and type of return flow channels.

Studies are now being undertaken on existing projects in small, closely controlled areas primarily to determine consumptive use and return flow. With a small additional expense, it will be possible to obtain inflow and outflow quality data and thereby determine the effect of irrigation on water quality. Results from these studies will not be available for some time. The study areas are purposely being held small to achieve better control, but they will be as representative as possible of existing projects. The results pertaining to the quantity of return flow will be very helpful in estimating effects on water quality of return flows from larger areas where measurement of inflow and outflow is not always possible or practical.

Special studies in other areas in the basin will be undertaken from time to time to determine water quality conditions, and studies of projects such as Florida and Eden will be repeated or continued in order to evaluate changes with time. The more complex areas will be considered for investigation at a later date when sufficient funds are available to carry out meaningful studies. Projects in this category include the Grand Valley and Uncompahgre projects in Colorado and possibly some direct diversion projects along the Colorado River below Hoover Dam, such as Palo Verde Valley and the Colorado River Indian Reservation. An important consideration in quality studies is measurement of return flow. If the return flow can be measured and its quality determined, the water and salt budgets can be computed because the inflow is nearly always gaged and its quality easily determined.

4. Lower Colorado River Studies

Mr. Burdge Irelan, of the Geological Survey, in a paper titled, "Trends in Quality of Water on the Lower Colorado River,"[1] states that "Both the relative and absolute quantities of sodium and chloride loads picked up by the Colorado River between Hoover and Imperial Dams seem to have been increasing, particularly during the last 5 to 10 years. This was, no doubt, caused by leaching of the more than 40,000 acres of land recently brought under cultivation.

"Although the average concentration and load of salts in the water of the Colorado River at Imperial Dam has increased in recent years, the

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1/ "Investigation of the Water Resources of the Lower Colorado River Area," U.S. Geological Survey, Open-File Report No. 3, dated May 21, 1964.

increases have been relatively small and of little consequence to downstream water users. With further leaching of new lands by continued irrigation, the gain in concentration between Hoover and Imperial Dams may be expected to decrease."

He further states that prior to 1950 the weighted-average concentrations of both sulfate and chloride were about 10 ppm greater at Imperial Dam than at Hoover Dam. Since 1950 the differences in concentration have always been greater than 10 ppm, have generally been greater than 20 ppm each year, and have ranged up to nearly 40 ppm.

The 40,000 acres of new land that have been brought under irrigation are in the Palo Verde Valley, the Colorado River Indian Reservation, and on Federal lands along the river. Most of this new land has been somewhat saline, and leaching has added significantly to the downstream chloride load.

Below Hoover Dam water quality along the main stem of the river is checked by analyzing daily samples taken at key stations operated by the Bureau of Reclamation in cooperation with the Geological Survey. Data obtained above each project diversion and below the return flow from the project show the effect irrigation has on water quality in each section of the river. Data are obtained periodically at various points along the river and in drains returning water to the river in cooperation with the U. S. Geological Survey, the Colorado River Indian Agency, the Metropolitan Water District, the Imperial Irrigation District, and others.

A limnological survey of Lake Mead is now being conducted by the Bureau of Reclamation. Samples are being obtained at 17 locations in the Boulder Basin of Lake Mead for determination of temperature, pH, conductivity, and dissolved oxygen and carbon dioxide contents. Chemical analyses for dissolved solids are being obtained for samples from some of the selected locations. These data are supplemented by observation of turbidity and unusual conditions.

PART VI. QUALITY OF WATER

A. Historic Condition

The historic water quality situation at eleven key stations in the Upper Basin for the 1941-1958 period was previously reported in the January 1963 report, both in narrative and in the tabulations. The station Green River near Green River, Wyoming, has been added. Three additional years of record have been accumulated, and new summaries have been completed. Runoff during the three years added--1959, 1960, and 1961--was much below normal. This reduced the average runoff for the longer 21-year period over that for the 18-year period. Low runoffs generally result in higher concentrations, and this was true for the 1959-1961 period with 1959 at 0.96, 1960 at 0.81, and 1961 amounting to 0.97 ton per acre-foot at Lees Ferry. The previous average concentration at the same station for the 1941-1958 period was 0.72 ton per acre-foot, and the new average for the 1941-1961 period is 0.74 ton per acre-foot, or 8,558,000 tons.

In the operation period 1941-1958, used in the 1963 report, Lake Powell content increased by over 8,000,000 acre-feet, resulting in some impoundment of dissolved solids in the reservoir. For the period 1941-1961, the beginning and ending contents remain near 14,000,000 acre-feet thus permitting better evaluation of the effect storage has on quality. This essentially amounts to a full cycle of operation with no carryover of dissolved solids in the reservoir.

Load data for all twelve stations in the Upper Basin are summarized in the tables along with data for five stations in the Lower Basin.

The average historical concentration of dissolved solids at Grand Canyon for the 1941-1961 period increased by 0.02 over the 1941-1958 period, while the concentration remained the same below Hoover Dam for the corresponding periods. Comparison of the Grand Canyon and below Hoover Dam data shows a large increase in concentration at the Hoover Dam station over Grand Canyon during the early part of the period and a decrease in some years during the latter part of the period.

In comparison with the below Hoover Dam station, the station below Parker Dam shows a decrease in average concentration, a decrease in average discharge of 777,000 acre-feet, and a decrease in average total dissolved solids of 950,000 tons per year. Comparison of the concentration and loads indicates a possible loss of dissolved solids in Lake Mohave and Lake Havasu beyond that diverted to the Metropolitan Water District of Southern California.

Between Parker and Imperial Dams there is a further net decrease of 599,000 acre-feet in the average discharge but a net increase of 387,000 tons per year of total dissolved solids.

The concentration of dissolved solids in the Virgin River at Littlefield, Arizona, is high but the discharge is small. The higher concentration increases the overall concentration of water discharged from Lake Mead by about 0.02 ton per acre-foot.

B. Ionic Loads

Annual summaries of the ionic loads at 12 stations in the Upper Basin for the 1941-1961 period have been included in this report to further depict quality conditions at various key stations. The tables give ionic loads in equivalents per million times discharge in acre-feet for the six principal ions with totals for the three cations and for the three anions. The amount of potassium is negligible and carbonates are lacking. This information is also available on a monthly basis (see example, Table No. 32).

A study based on the various ions inflowing to the Lake Powell area from the Colorado, Green, San Rafael and San Juan Rivers has been made for comparison with the ionic load data at Lees Ferry. The resultant data represent conditions prior to storage in Lake Powell. Similar data collected after storage begins will permit comparison of conditions both before and after storage, and will provide information about changes in concentration of ions in the reservoir basin resulting from storage. One difficulty that becomes apparent from this study is that the percentage of change in ionic load is frequently within the range of accuracy for streamflow and quality measurement.

The ionic changes according to the study average as follows:

Ion	Percentage increase at Lees Ferry over sum of upstream tributaries
Calcium	12
Magnesium	5
Sodium	2
Bicarbonate	7
Sulphate	7
Chloride	9
Total Dissolved Solids	8

C. Present Modified Condition

During the 21-year period of study covered by this report, none of the depletions listed in Table No. 19 were in effect. Some new depletions began after 1961; therefore, the depletion effects for present modified flow purposes will be the same as those used in the 1963 Quality of Water report.

Present modified flow, as defined for this report, is the flow expected at any point with all upstream existing projects in operation for the full period of study. It was estimated at the various stations by assuming a recurrence of past water supply conditions and by deducting from the annual historical flows the depletions that would have resulted from the operation of all upstream projects constructed since that year. It should be noted that when a project becomes fully operational, the gaging station reflects the depletion and present modified flow then becomes equal to historical flow.

Historical flows since 1941 have been affected by the transmountain diversions of the Colorado-Big Thompson project and the Duchesne Tunnel of the Provo River project, along with a number of small in-basin developments. Most of these in-basin developments have been made possible by new storage facilities, thereby permitting more consumptive use on a smaller acreage.

After the present modified flows were computed, the quality data were extended to give the expected quality for the study period. Quality data were computed by taking into consideration the weighted average of the concentrations of total dissolved solids for the various transmountain diversions. Also, the change in quality resulting from the in-basin developments was computed on the basis of an assumed pickup of 2.0 tons of total dissolved solids per acre of irrigated land and a depletion of 1.5 acre-feet of water per irrigated acre.

Comparison of the historic and present modified flow columns of Tables No. 1 to 17 indicates that flow is less and the concentrations greater under present modified conditions than under historic conditions. For those drainage basins where no significant development had taken place during the 21-year period, the flow and quality data were considered to be the same under historic and present modified conditions. There were no significant developments in the Upper Basin during the 1959-1961 period, so present modified and historical flow and quality are the same.

As in the previous report, present modified flows are used as a basis for developing the anticipated effect of the storage units, participating projects, and other developments.

PART VII. ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

In order to estimate the probable effect of the authorized or contemplated developments on the quality of water at certain points along the Colorado River, the developments have been separated into five increments similar to those used in the January 1963 report. By means of operation studies the estimated effects of each increment can be shown at the pertinent gages. These results are tabulated in Table No. 18 for the new period of record used in this report.

The increments are: (1) storage units of the Colorado River storage project; (2) participating projects of the Colorado River storage project and other miscellaneous developments; (3) San Juan-Chama project and Navajo Indian irrigation project; (4) Fryingpan-Arkansas project; and (5) Marble Canyon, Bridge Canyon, and Dixie projects.

The first increment or the effect of storage was computed by imposing the storage regulation and reservoir losses on the present modified conditions at applicable locations as given in Table No. 18. The second increment was then added to the effect of the storage units and the new effects from the remaining two increments were then added only to the records of appropriate stations in the Colorado and San Juan River basins as these developments do not alter conditions in the Green River basin. The final figures listed show the cumulative effects of the five increments.

Following is a discussion of each increment including a brief description of the physical conditions for each development authorized or contemplated for authorization within each increment and the anticipated effect of each increment on the quality of water at appropriate key stations.

The effects of all upstream developments are carried on down to and including Imperial Dam.

A. Description of Projects

Increment No. 1
Storage units of the Colorado River Storage project

Glen Canyon Unit

The Glen Canyon Dam is located on the Colorado River in Arizona 4 miles south of the Utah-Arizona boundary and 15 miles upstream from Lees Ferry. The bulk of the reservoir lies in Utah. At a normal water surface elevation of 3,700 feet m.s.l., Lake Powell would extend 186 river miles up the Colorado River and 71 miles up from the mouth of the San Juan River. River mile 71 on the San Juan River is 133 river miles from Glen Canyon Dam. This 27,000,000-acre-foot reservoir will regulate the flow of the river for compact delivery purposes and for power generation and thus permit exchanges for upstream consumptive use of the water. Fish and wildlife conservation and recreation will also be of major significance. Annual reservoir losses are estimated to be 546,000 acre-feet per year.

Storage commenced March 13, 1963, in Lake Powell, and the last bucket of concrete topping out the dam was placed September 13, 1963. The effect of Lake Powell storage on water quality downstream from Lees Ferry commenced, therefore, on March 13, 1963, other than minor regulation during construction which caused some sediment deposition in Lake Powell.

Flaming Gorge Unit

This storage unit is located on the Green River in northeastern Utah and southwestern Wyoming. The primary purposes of the Flaming Gorge unit are the regulation and storage of flood flows of the Green River and the generation of hydroelectric power. The reservoir will have a storage capacity of 3,789,000 acre-feet and annual reservoir losses of about 52,000 acre-feet. The stored water will assist in complying with the terms of the Colorado River compact and will, by exchange, furnish an irrigation supply for the participating projects in the Upper Basin States. In addition there will be benefits from fish and wildlife conservation and recreational facilities. Storage commenced November 1, 1962, at Flaming Gorge Reservoir, and, from the records taken immediately below the dam, it appears that the outflowing water will be nearly uniform in quality.

Navajo Unit

The Navajo Dam and Reservoir are located on the San Juan River in northwestern New Mexico and southwestern Colorado. Total storage capacity of the reservoir is 1,709,000 acre-feet and the reservoir evaporation losses are estimated to be 36,000 acre-feet annually. This reservoir will regulate the flow of the river for irrigation of the Hammond project, the Navajo Indian irrigation project, and for other uses, including, by exchange, potential uses above the reservoir and transmountain diversions to the San Juan-Chama project. It will also help regulate the flows of the Colorado River at Lees Ferry. Other purposes include recreation, sediment control, fish and wildlife propagation, and flood control. Storage began July 1, 1962, and the effect on quality is recorded at the Archuleta station below Navajo Dam.

ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

Curecanti Unit

Facilities of the Curecanti unit, located in west-central Colorado, include the Blue Mesa, Morrow Point, and Crystal Dams, Reservoirs, and Powerplants. The primary purposes are regulation and storage of flood flows of the Gunnison River and generation of hydroelectric power. In addition, benefits will be provided to recreation, fish and wildlife conservation, and irrigation. The reservoirs of the Curecanti Unit will help regulate the flows of the Colorado River at Lees Ferry. The storage capacity provided is 940,000 acre-feet at Blue Mesa, 117,000 acre-feet at Morrow Point, and 27,000 acre-feet at Crystal Reservoir, with total reservoir evaporation losses estimated at 15,000 acre-feet annually for all three units. Storage will not be initiated until late in 1965 at the Blue Mesa Reservoir; however, based on the results of storage on quality at other storage units, it is expected that concentration of dissolved solids below the Curecanti unit will be nearly uniform.

Increment No. 2
Participating projects and other miscellaneous projects

Seedskadee Project

This multipurpose project is located adjacent to and will divert water from the Green River in southwestern Wyoming. The project will provide a full water supply for 43,420 acres with a depletion of about 25,000 acre-feet in the 1941-1961 period. Later, an additional 15,000 acres will be irrigated after a determination has been made of the effect that the mining of trona will have on land subsidence and irrigation development. The total depletion would be increased to about 150,000 acre-feet when the full acreage is developed. Municipal and industrial water, recreation, and fish and wildlife protection are other purposes of the project. Fontenelle Dam is complete and the powerplant is nearing completion, but irrigation of the project acreage will await results from the development farm now undergoing tests in the project area. This is a new project area that will give a good opportunity to determine the effect of irrigation on the quality of water.

Lyman Project

This is a multipurpose project located in southwestern Wyoming. Project facilities consist of two dams and reservoirs. One will be located at the Meeks Cabin site on the Blacks Fork in Wyoming and will provide 33,000 acre-feet of storage capacity. The other will be located at the China Meadows site of the East Fork of Smith Fork in Utah and will provide 13,000 acre-feet of storage capacity. The project will have the primary purpose of providing supplemental water to 42,674 acres of existing farmland along with fish and wildlife and recreation benefits. Construction is now under way with initial storage scheduled for 1967.

ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

This project will give an opportunity to study the effect on quality of adding supplemental water to lands already irrigated. The resulting new depletion will be 10,000 acre-feet.

Emery County Project

The Emery County project is located in east-central Utah and is multipurpose in scope. It will furnish a supplemental irrigation water supply to 18,000 acres and a full supply to 770 acres of new land with a resulting new depletion of 17,000 acre-feet. The project will also benefit fish and wildlife and recreation. Construction is under way but no storage is anticipated until late in 1965. It has been anticipated that the addition of supplemental water would improve the quality of water below the project in some months, but a period of actual operation will be required to determine the extent, if any, of such improvement.

Silt Project

This project now being constructed is located along the Colorado River in western Colorado and will obtain water from Rifle Creek and by pumping from the Colorado River. Rifle Gap Reservoir will store 12,650 acre-feet. A full supply will be furnished to 2,120 acres of new land and a supplemental supply to 4,160 acres.

The water of Rifle Creek is shown by laboratory analysis to be of good quality for irrigation. Return flows from irrigated lands are also suitable for reuse on lower lands. The Cameo station shows the Colorado River water to be of high quality throughout the year. The new annual stream depletion is 6,000 acre-feet.

Smith Fork Project

This project provides a supplemental supply of water for 8,056 acres and a full supply to 1,420 acres of new land in west-central Colorado. It will deplete the flow of the Gunnison River by 6,000 acre-feet. Construction has been completed and the project is in operation. This small project is expected to have very little effect on quality, and no special inflow-outflow studies are anticipated.

Hammond Project

Construction is complete on the 3,900-acre Hammond project. Irrigation is accomplished by a direct diversion from the San Juan River to lands lying adjacent to the river. The multiple points of return flow make it impractical to evaluate the quantity and quality of the return flow water. The inflowing water to the project will be of excellent quality and, because of the small quantity of return flow, it is expected that there will be little effect on the quality of water in the San Juan River below the project. This project will deplete the flow of the San Juan River by 9,000 acre-feet annually.

ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

Florida Project

Construction is nearing completion on the Florida project. The primary purpose of this multipurpose project is to provide a full water supply for the irrigation of 5,730 acres of new land and a supplemental supply for 13,720 acres. There will also be benefits to flood control, fish and wildlife, and recreation. The water delivered to the Florida project lands is of excellent quality which permits the use of a high percentage of return flow within the project area. After the reuse of return flows, the drainage water from this project will still be suitable for further use downstream. The florida project will deplete the flow of the San Juan River by about 14,000 acre-feet.

Collbran Project

This project is located on Plateau Creek, a tributary of the Colorado River in western Colorado. Construction is complete and the project is in full operation. It provides supplemental water to 19,750 acres and a full supply to 2,460 acres of new land. The new consumptive use will be 7,000 acre-feet. The inflowing water to this project is of excellent quality (0.10 ton per acre-foot). The weighted average concentration of dissolved solids in the water in Plateau Creek, containing mostly return flows from Collbran project, is 0.39 ton per acre-foot. This indicates that only a small amount of dissolved solids is picked up on the project land.

Fruitland Mesa Project, Colorado

This project is located in western Colorado in the Gunnison River Basin. A 44,600-acre-foot storage reservoir on Soap Creek and diversion from Crystal and Curecanti Creeks would provide water needed for 16,520 acres of newly irrigated land and 7,000 acres of land now irrigated. Project uses will increase Colorado River depletions by 28,000 acre-feet per year.

The project water for irrigation use has been determined by laboratory analysis to be of excellent quality. Likewise, most of the return flow considered as part of the project water supply would be diluted with higher quality direct flow.

Bostwick Park Project, Colorado

This small project is located in Montrose and Gunnison Counties in west-central Colorado. Storage regulation would be provided by a 10,600-acre-foot reservoir on Cimarron Creek, a tributary of the Gunnison River. Only 1,320 acres of new land would be irrigated, and the increased depletion to the Colorado River would be 3,000 acre-feet. Some additional water would be provided to land now irrigated. The water of Cimarron Creek has been determined by laboratory analysis to be of good quality for irrigation.

ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

Savery-Pot Hook Project, Colorado-Wyoming

This project is located in the Little Snake River Basin in southern Wyoming and northwestern Colorado. The project plan calls for construction of an 18,600-acre-foot capacity reservoir on Savery Creek and a 65,000-acre-foot capacity reservoir on Slater Creek. This storage will make possible the irrigation of 21,920 acres of new land and will provide supplemental water for land presently irrigated. Depletion of the Little Snake River by the Savery-Pot Hook project would amount to 38,000 acre-feet annually.

Denver, Englewood, and Colorado Springs Diversions

The so-called "Blue River Settlement" authorizes the transmountain diversion of an average of 181,000 acre-feet of water per year from the Blue River in the headwaters of the Colorado River to the cities of Denver and Colorado Springs and from the Fraser Basin to the city of Englewood on the eastern slope. This system is partially completed and some diversions are now being made. Under ultimate development the diversions would vary from a low of 47,000 acre-feet in a year like 1954 to a high of 288,000 acre-feet in a year similar to 1947.

Central Utah Project

Bonneville Unit--The Bonneville unit will include a transmountain diversion of water from the headwaters of the Duchesne River in the Uinta Basin portion of the Colorado River Basin to the Bonneville Basin. Related developments of local water sources will be made in both basins. The project will develop water for irrigation, municipal and industrial use, and power production. It will also provide benefits to recreation, fish and wildlife, flood control, water quality control, and area redevelopment.

The net depletion to the Green River is 173,000 acre-feet, of which 136,000 is depleted in the Bonneville Basin and the balance in the Uinta Basin.

Upalco and Jensen Units--These two units of the Central Utah project will be part of the initial phase of the project which is now under investigation. They will be developments within the Uinta Basin and will generally provide supplemental water for lands presently irrigated. Present indications are that development of new lands will be limited to about 1,240 acres. A depletion of 7,000 acre-feet has been estimated for these units pending further studies.

Vernal Unit--Construction on the Vernal unit is complete. This unit diverts water from the Ashley Creek drainage to furnish a supplemental supply to 14,700 acres of partially irrigated land and 1,600 acre-feet of supplemental water for municipal use near Vernal, Utah. The consumptive use of water by the Vernal unit will amount to 12,000 acre-feet annually.

Private Industrial Developments

A number of private industrial developments either under construction or contemplated will result in certain small annual depletions, but they will have practically no effect on water quality.

A potash development near Moab, Utah, will consumptively use about 6,000 acre-feet of water annually.

Industrial developments in southwestern Wyoming, including the Utah Power & Light Company's steam electric powerplant at Kemmerer, will consumptively use about 17,000 acre-feet annually.

In northwestern New Mexico a large steam electric powerplant being developed by Utah Construction and Mining Company for the Arizona Power Authority and the Navajo Indians will evaporate about 39,000 acre-feet annually when fully developed.

Little Snake Diversions

Transmountain diversions from the Little Snake River Basin, Wyoming, for the cities of Laramie and Cheyenne will amount to about 7,000 acre-feet annually.

Homestake Project, Colorado

The Homestake project in Colorado, now under construction by the cities of Aurora and Colorado Springs, would divert an average of 73,000 acre-feet annually to the eastern slope from the headwaters of the Colorado River. These diversions would vary from a low of 50,200 acre-feet to a high of 108,400 acre-feet in a period similar to the 1941 to 1961 period.

Increment No. 3
San Juan-Chama project and Navajo Indian Irrigation project

San Juan-Chama Project

Construction is just beginning on this transmountain diversion project with delivery of water to the Rio Grande Basin expected to be initiated in 1968. The project will divert an average of 101,000 acre-feet annually (for the study period 1941-1961, inclusive,) from the headwaters of the San Juan River across the Continental Divide to the Rio Grande

Basin. The physical effects on the Colorado River of this depletion will be that some dissolved solids will be transported out of the basin and less high quality water will be available downstream for dilution of lower quality water.

The water will be used in New Mexico for municipal and industrial uses and irrigation.

Navajo Indian Irrigation Project

Construction activities are underway on this project but completion of construction and delivery of water are several years away. The direct diversion of 508,000 acre-feet of water annually from the Navajo Reservoir to 110,000 acres of Indian-owned lands south of the San Juan River is contemplated. None of these lands is presently irrigated and the effect of irrigation on the quality and quantity of return flow is difficult to predict. With good quality water being delivered to the project lands, the quality of the return flow will be determined mostly by the amount of dissolved solids picked up from the project lands and the amount of return flow reaching the San Juan River. Reuse of return flow will be very limited so this will not serve to further concentrate dissolved solids. The estimated depletion is 253,000 acre-feet annually.

Increment No. 4
Fryingpan-Arkansas project

Fryingpan-Arkansas Project

Construction is barely underway on this project, and, with a number of features to construct, the initial storage will not commence until 1967. This transmountain diversion project will transfer water from the headwaters of the Colorado to the Arkansas River. It is a multipurpose development to supply supplemental irrigation water, municipal water, and water for power production. In addition the project will also control floods originating above Pueblo, retain sediment, preserve fish and wildlife, and provide recreation opportunities. The average annual depletion during the study period would be 67,000 acre-feet, including 1,000 acre-feet of evaporation from the Ruedi Reservoir on the west slope.

Increment No. 5
Lower Basin projects

Marble Canyon Project

The Marble Canyon project would be composed of Marble Canyon Dam and Reservoir, powerplant, transmission facilities, and related recreation and fish and wildlife development facilities.

ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

The project has been proposed for development under the Pacific Southwest Water Plan and as a private development by the Arizona Power Authority. If developed under a Federal program, the project would provide for 98,000 acre-feet of capacity for sediment control on the Paria River to protect Marble Canyon Reservoir capacity and Glen Canyon tail water channel from sediment encroachment.

The proposed 363,000-acre-foot reservoir would be located in geologic formations which would not adversely contribute to water quality problems. It is estimated that the average losses to evaporation from Marble Canyon and the Paria Reservoirs would be 14,000 acre-feet annually.

Bridge Canyon Project

The Bridge Canyon project would be composed of Bridge Canyon Dam and Reservoir, Powerplant, transmission facilities, and related recreation and fish and wildlife development facilities. Coconino Dam and Reservoir on the Little Colorado River would also provide 2,100,000 acre-feet of capacity for sediment and debris control for the Grand Canyon National Park and protect Bridge Canyon Reservoir capacity.

The unit has been proposed for development under the Central Arizona Project Plan and the Pacific Southwest Water Plan.

The 3,710,000-acre-foot reservoir would not vary appreciably in operation, and it is estimated that the annual evaporation losses from both Coconino and Bridge Canyon Reservoirs would be about 102,000 acre-feet. As is the case with Marble Canyon Reservoir, the geologic or physical formations in Bridge Canyon are not expected to contribute to water quality deterioration.

Dixie Project, Utah

The recently authorized Dixie Project would, through construction of multipurpose dams on the Virgin and Santa Clara Rivers, provide a full water supply to 11,615 acres of new land and a supplemental water supply to 9,445 acres of existing irrigated land. About 5,000 acre-feet of municipal and industrial water would be provided to the city of St. George. Cedar City, Utah, could also exercise an existing agreement to divert up to 8,300 acre-feet of water out of the basin from upper tributaries.

The Virgin City Dam and Reservoir on the Virgin River would have an initial capacity of 246,000 acre-feet of which 66,000 acre-feet would be allocated to agricultural and municipal and industrial water supply uses and 180,000 acre-feet would be allocated to sediment storage.

The Lower Gunlock Dam and Reservoir on the Santa Clara River would have a capacity of 24,000 acre-feet, of which 10,000 acre-feet would be provided for sediment retention and flood control space. The remaining 14,000 acre-feet would be reserved for irrigation storage.

ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

A principal concern of the downstream users in Arizona and Nevada will be in regard to the effect of project operations on water quality and the amount of flood waters available for leaching purposes. In this regard, the effect of the highly mineralized LaVerkin Springs, which enter the river a short distance below the proposed Virgin City Dam, is of considerable importance.

The estimated increased depletion of the Virgin River due to total project development would be 62,000 acre-feet per year. Disposal of the waters of the LaVerkin Springs would increase the estimated annual depletion by the quantity of water removed from the river system. The average annual flow of the Virgin River at Littlefield under present conditions based on January 1941 through December 1961 records is 160,300 acre-feet.

B. Incremental Effects

Increment No. 1

The extension of the study period from 1941-1958 to 1941-1961 resulted in a decrease in the average modified flow at Lees Ferry of 595,000 acre-feet, an increase in the dissolved solids concentration of 0.01 ton per acre-foot, and a decrease in annual load of 273,000 tons. The decrease in load and flow result from 3 years of much below normal runoff in the Colorado River Basin.

The anticipated effect of the four storage units (Curecanti, Flaming Gorge, Glen Canyon, and Navajo) is shown in Table No. 18, columns 6, 7, and 9. In arriving at these results, it is assumed that 5 percent of the incoming dissolved solids in Lake Powell will be precipitated in the reservoir basin. It is expected that some precipitation of dissolved solids will also occur in the upstream reservoirs. However, for the purposes of this study, it was assumed that there would be no losses of dissolved solids in the upstream reservoirs. Inflow-outflow studies will be initiated to determine what the actual effects are under operating conditions.

The anticipated effect of the storage reservoirs on quality of water at the Lees Ferry station, as a result of reservoir losses, will be to increase the dissolved solids concentration from 0.76 to 0.81 ton per acre-foot. With an assumed 5 percent of the incoming solids retained in Lake Powell, the average concentration would be reduced to 0.77 as shown in the table.

The storage reservoirs would have a similar effect on the dissolved solids in the water below Lees Ferry, increasing the concentrations from 0.01 to 0.03 ton per acre-foot from Grand Canyon to Imperial Dam.

Increment No. 2

The projects added since the January 1963 report increase the depletions in increment No. 2 by 157,000 acre-feet. The amount of new irrigated land and the average annual depletions for each project are listed in Table No. 19.

The effects under increment No. 2 include: depletions from miscellaneous projects, a minor amount of evaporation from participating project reservoirs, transmountain diversions, participating project depletions, and the effect of irrigation under salt balance conditions and with an assumed pickup of 2 tons per acre on the irrigated lands. Although the range of pickup from 0 to 2 tons has been assumed for these studies, the assumption appears to be substantiated by developments on the Eden, Florida, and other projects. Further, more detailed studies will be made to develop better estimates of the yield of salts from irrigation projects.

ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

The effect of the Seedskadee irrigation project on water passing the Green River, Wyoming, gage would be an increase in concentration from 0.43 to 0.47 ton per acre-foot, if no dissolved solids are leached from the land; and if 2 tons per acre are picked up, the concentration would increase to 0.55 ton per acre-foot.

Moving on down the Green River to the Greendale gage, with the Flaming Gorge Reservoir in operation, the Seedskadee and Lyman irrigation projects and industrial developments, including the Utah Power & Light Company steamplant, would increase the concentration by 0.06 ton per acre-foot to 0.61 ton per acre-foot if no dissolved solids are picked up, and to 0.67 ton per acre-foot if 2 tons per acre are picked up.

The Duchesne River near Randlett would be affected mostly by the transmountain diversions to the Central Utah project, and with zero pickup the concentration would increase from 0.98 to 1.59 tons per acre-foot.

The Green River near Ouray, Utah, and the Green River at Green River, Utah, stations are both affected by the same upstream developments. The concentration would increase by 0.04 and 0.06, respectively, with no pick-up and 0.08 and 0.09, respectively, with 2 tons per acre of pickup.

The Emery County project would increase the concentration of the San Rafael River near Green River, Utah, from 2.20 to 2.70 tons per acre-foot under either of the assumed conditions of pickup.

The flow past the Cameo gage on the Colorado River is affected by transmountain diversions to Denver, Englewood, Colorado Springs, and Aurora, Colorado, and by the Silt project. These depletions would increase the dissolved solids concentration at Cameo by 0.05 ton per acre-foot under either condition of pickup.

On the Gunnison River near Grand Junction with the Curecanti Unit in operation the concentration would be affected by the Paonia, Smith Fork, Fruitland Mesa, and Bostwick Park projects resulting in a 0.02 ton per acre-foot increase with no pickup and a 0.05 increase with 2 tons per acre pickup.

The Colorado River near Cisco gage is affected by the East slope diversions and by the Silt, Paonia, Collbran, Smith Fork, Fruitland Mesa, and Bostwick Park projects. These transmountain diversions and irrigation projects increase the concentrations from 0.87 to 0.93 ton per acre-foot with no pickup and to 0.94 with 2-ton per acre pickup.

The San Juan River near Bluff gage is affected by the Hammond, Florida, and Utah Construction Company depletions. These depletions result in a 0.02-ton per acre-foot increase with no pickup and a 0.03-ton increase with 2 tons of pickup.

ANTICIPATED EFFECTS OF ADDITIONAL DEVELOPMENTS

The total depletions of Increment No. 2 increase the concentration at Lees Ferry from 0.77 to 0.82 ton per acre-foot with no pickup, and with two tons of pickup the concentration increases from 0.77 to 0.84 ton per acre-foot.

The sizable depletions of this increment have somewhat the same effect at Grand Canyon and Hoover as they do at Lees Ferry, but the decrease in the available water at Parker and Imperial Dams results in increases in concentrations at Imperial of 0.11 ton per acre-foot with no pickup and 0.13 with a 2-ton per acre pickup, or a total of 1.22 tons per acre-foot.

Increment No. 3

Increment No. 3 is composed of the San Juan-Chama transmountain diversions and the Navajo Indian irrigation project which constitutes the largest new irrigation project withim the Upper Colorado River Basin.

At Archuleta the San Juan River is affected by depletions only from these two projects, resulting in an increase in total dissolved solids from 0.22 to 0.24 ton per acre-foot.

At Bluff, the San Juan River is affected by the return flows from the Navajo Indian irrigation project, showing an increase in concentration from 0.60 to 0.76 ton per acre-foot with no pickup and to 0.95 ton with 2 tons of pickup.

The effect of Increment No. 3 at the Lees Ferry gage is to increase the concentration by 0.03 ton per acre-foot with no pickup and by 0.06 with the assumed pickup of two tons per acre.

The San Juan-Chama and Navajo Indian irrigation projects have about the same effects at Grand Canyon, Hoover, and Parker as at Lees Ferry with slightly larger increases resulting at Imperial Dam.

Increment No. 4

The Fryingpan-Arkansas project is a transmountain diversion project increasing the concentration of the river at the Cameo gage by 0.02 ton per acre-foot and at the Cisco and Lees Ferry gages by 0.01. The Fryingpan-Arkansas depletion also increases the concentrations by 0.01 ton per acre-foot at all stations below Lees Ferry except for Grand Canyon where the concentration remains the same.

Increment No. 5

This increment includes the depletions for Marble Canyon, Bridge Canyon, and the Dixie project with Marble Canyon affecting concentrations at the downstream gages beginning with Grand Canyon, the Dixie project affecting the Virgin River at Littlefield, and the Dixie project and Bridge Canyon Reservoir affecting other downstream gages beginning with the below Hoover gaging station.

The Marble Canyon, Bridge Canyon, and Dixie projects increase the concentration at Hoover Dam by 0.02 ton per acre-foot with no pickup and by 0.04 at Imperial with 2 tons of pickup on the Dixie project. The total concentration at Imperial amounts to 1.36 tons per acre-foot with all increments in operation.

PART VIII. INTERPRETATIONS

A. Suitability for Irrigation

Irrigation has been practiced in many areas in the Colorado River Basin for nearly a hundred years; and as long as adequate drainage has been provided, either natural or artificial, there has been little loss of productivity through salinization and alkalinity of the soils. While early irrigation began without particular regard to water quality, this now is an important consideration, and on all projects the quality of the water is studied in relation to the soil on which it is to be used.

No rigid limits of salinity have been set for irrigation waters within the basin and none seem advisable under varying soil and cropping conditions encountered. It will always be necessary to evaluate water quality in light of soil conditions as well as cropping patterns and irrigation practices.

The Colorado River accumulates an increasing mineral content both from natural sources and irrigation uses as it moves downstream from its headwaters. Despite these increases the water is still suitable for irrigation in the lower reaches of the basin. Proper irrigation practices including drainage are stipulated requirements in order for irrigation to be successful. Many crops will not flourish when subjected to a high water table regardless of salt content, so drainage serves a twofold purpose on irrigated lands.

B. Suitability for Industrial Use

The Colorado River water has not been widely used for industrial purposes within the basin but extensive use has been made of this water from transmountain diversions outside the basin, and wherever used it has proved generally satisfactory.

One primary requirement for industries is that the concentration of the various constituents remain relatively constant. Once a particular industrial process is started and the water treatment has been determined, any fluctuation in quality requires continued attention and expense. Snowmelt runoff streams are subject to seasonal changes in quality. Storage reservoirs level out the seasonal changes in quality and, with a greater amount of storage now available in the basin, the possibilities for industrial use are now much greater.

The quality of water required for industrial use varies widely for the many purposes to which water is put, and within any industrial plant water may have several functions. The yearly summary of ions at the various quality stations, as shown beginning with Table 20, provides data that can be used with industrial water-quality criteria to evaluate the suitability of the water for the particular purposes of certain industries. This information is also available on a monthly basis for the 1941-1961 period in supporting data to this report.

C. Suitability for Domestic Use

One purpose of these quality of water studies is to determine the suitability of Colorado River water for domestic purposes in the various areas where it is used or proposed to be used. This would include estimating the effects of additional developments and evaluating the suitability above and below present irrigation and industrial developments.

The quantity of water used at present for domestic purposes within the Upper Basin is small compared to irrigation uses. It is estimated that more domestic water is exported out of the basin than is used within the basin, and this generally is good quality water from the higher elevations.

Most of the authorizing reports prepared for Federal projects evaluate the quality of water for domestic use along with irrigation, and in many instances domestic water is being provided by the project for municipal use. In other cases storage space is allocated for future domestic use. It is also expected that some project water now intended for irrigation use will eventually be used for domestic purposes as the population increases.

Storage usually improves surface water supplies for domestic use by providing water of more uniform quality, and by reducing sediment and turbidity. Operation studies have been performed to determine the effects of new developments on quality (see Table No. 18). The results are applicable to irrigation, domestic, or industrial uses with respect to dissolved solids concentration.

The physical, chemical, and bacterial quality of drinking water in the United States is now judged in relation to the recommended Public Health Service Drinking Water Standards of 1962. These recommended standards apply only to drinking water and water supply systems used by interstate carriers and others subject to Federal Quarantine Regulations. However, the Departments of Public Health of most of the States using Colorado River water have voluntarily accepted these standards for all public water supplies.

Under the conditions expected with the developments now authorized, the storage water will be suitable for domestic use in most cases, and with a few exceptions, such as the San Rafael River below Emery County project, the return flows diluted with natural runoff will also be satisfactory.

INTERPRETATIONS

The Metropolitan Water District of Southern California has obtained a portion of its water supply for municipal and industrial use by pumping Colorado River water from Lake Havasu since January 7, 1939. The quantity pumped increased gradually to a total of about 1,100,000 acre-feet in 1961. The quality of the water has always been suitable with appropriate treatment for domestic and industrial use in the southern California area.

Many quality studies have been performed outside the scope of this program. The results of those studies and analyses were available for this study and have been included when pertinent. For the Central Utah project, chemical analyses of more than 1,200 water samples taken at about 100 collection points have been used to determine quality conditions within the project area for both domestic and irrigation uses.

Domestic uses in the future will become more important and water quality more critical both within and outside the basin area. The present data collection program will likely be continued, some stations may be added, and some monitoring will be required.

PART IX. CONCLUSIONS

These studies indicate an overall increase in the concentrı total dissolved solids under the conditions of development outliı ın the basin, but the new depletions described leave the remaining water acceptable for reuse. The concentration of total dissolved solids at Imperial Dam will increase about 23 percent under the condition of zero pickup from new irrigated land and about 28 percent if the 2-ton per acre pickup is assumed for new land.

The addition of large storage units throughout the entire basin will stabilize the quality of water condition during the year at many new points in the basin and dampen out the longtime fluctuations in water quality. Precipitation of total dissolved solids in the larger reservoirs will offset some of the addition to the stream system caused by inbasin use.

Operation of the many new reservoirs in the basin will permit increased accuracy in the forecasting of the quality of water delivered to the many projects and points of diversion in the basin.

The tributaries with exceptionally high total dissolved solids content have minor effect on the dissolved-solids concentration of the Colorado River as the volume of water and total tonnage of dissolved material represents only a very small portion of the total. This is illustrated by Figure No. 2.

The special studies of irrigation projects that have been undertaken and their effect on the chemical quality of water permit these preliminary conclusions:

1. The early years of irrigation are generally the most detrimental to downstream water quality. This is primarily due to an abundance of soluble salts not previously exposed to a large amount of water.

2. Firm determinations cannot be made during the early years of development regarding the ultimate effect of irrigation. The primary factors in establishing equilibrium are the availability of soluble salts in the soils, the capacity of the ground water reservoirs, and the uniformity of irrigation practice in the area in question.

3. Each irrigated area has a different effect on quality depending upon properties of the soils and substrata in the drainage area, number of years the land has been irrigated, number of times return flow is reused, nature of the aquifers, rainfall, amount of dilution caused by surface wastes, temperature, storage reservoirs, vegetation, and types of return flow channels.

CONCLUSIONS

4. It must be recognized that there is a vast salt load existing in the streams and rivers due to natural conditions.

5. Future studies should consider other aspects of water quality effects, such as ion exchange, selective precipitation of salts, and changes in chemical composition (hardness, concentrations of specific constituents, etc.) on the river systems.

TABLES AND ILLUSTRATIONS

Table 1

Colorado River Basin

Flow and Quality of Water Data

Green River near Green River, Wyoming

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	Jan.	22	0.73	16	22	0.73	16
	Feb.	19	.74	14	19	.74	14
	March	45	.69	31	45	.69	31
	April	95	.54	51	95	.54	51
	May	174	.52	90	172	.53	91
	June	342	.34	116	339	.35	118
	July	137	.37	51	135	.39	53
	Aug.	81	.46	37	81	.48	39
	Sept.	48	.54	26	48	.58	28
	Oct.	67	.60	40	68	.60	41
	Nov.	53	.64	34	54	.65	35
	Dec.	26	.81	21	26	.85	22
	Total	1,109	.48	527	1,104	.49	539
1942	Jan.	24	.79	19	24	.79	19
	Feb.	23	.83	19	23	.83	19
	March	43	.70	30	43	.70	30
	April	200	.41	82	200	.41	82
	May	151	.50	75	150	.51	76
	June	337	.34	114	334	.35	116
	July	205	.32	66	202	.34	68
	Aug.	58	.52	30	56	.57	32
	Sept.	32	.62	20	31	.71	22
	Oct.	29	.76	22	30	.77	23
	Nov.	26	.81	21	27	.81	22
	Dec.	26	.77	20	27	.78	21
	Total	1,154	.45	518	1,147	.46	530
1943	Jan.	27	.78	21	27	.78	21
	Feb.	29	.76	22	29	.76	22
	March	59	.63	37	59	.63	37
	April	200	.41	82	200	.41	82
	May	237	.39	93	236	.40	94
	June	476	.29	138	473	.30	140
	July	359	.25	90	356	.26	92
	Aug.	121	.39	47	119	.41	49
	Sept.	50	.54	27	49	.59	29
	Oct.	48	.67	32	49	.67	33
	Nov.	43	.67	29	44	.68	30
	Dec.	30	.77	23	31	.77	24
	Total	1,680	.38	641	1,673	.39	653
1944	Jan.	25	.80	20	25	.80	20
	Feb.	25	.80	20	25	.80	20
	March	31	.77	24	31	.77	24
	April	267	.37	99	267	.37	99
	May	155	.46	71	153	.47	72
	June	351	.33	116	348	.34	118
	July	230	.30	69	227	.31	71
	Aug.	60	.50	30	58	.55	32
	Sept.	31	.65	20	30	.73	22
	Oct.	38	.71	27	39	.72	28
	Nov.	31	.74	23	32	.75	24
	Dec.	21	.81	17	22	.82	18
	Total	1,265	.42	536	1,257	.44	548
1945	Jan.	24	.79	19	24	.79	19
	Feb.	27	.74	20	27	.74	20
	March	41	.68	28	41	.68	28
	April	78	.58	45	78	.58	45
	May	111	.52	58	109	.54	59
	June	245	.38	93	242	.39	95
	July	284	.28	80	281	.29	82
	Aug.	125	.39	49	123	.41	51
	Sept.	76	.45	34	75	.48	36
	Oct.	64	.62	40	65	.63	41
	Nov.	42	.69	29	43	.70	30
	Dec.	33	.73	24	34	.74	25
	Total	1,150	.45	519	1,142	.46	531
1946	Jan.	32	.75	24	32	.75	24
	Feb.	26	.77	20	26	.77	20
	March	65	.62	40	65	.62	40
	April	131	.48	63	131	.48	63
	May	212	.41	87	209	.42	88
	June	320	.34	109	315	.35	111
	July	153	.35	54	149	.38	56
	Aug.	74	.47	35	71	.52	37
	Sept.	52	.52	27	52	.56	29
	Oct.	58	.64	37	60	.63	38
	Nov.	51	.67	34	52	.67	35
	Dec.	51	.67	34	52	.67	35
	Total	1,225	.46	564	1,214	.47	576
1947	Jan.	26	0.81	21	26	0.81	21
	Feb.	30	.73	22	30	.73	22
	March	141	.47	66	141	.47	66
	April	75	.57	43	75	.57	43
	May	368	.33	121	363	.34	122
	June	501	.29	145	493	.30	147
	July	327	.26	85	320	.27	87
	Aug.	199	.32	64	195	.34	66
	Sept.	81	.44	36	81	.47	38
	Oct.	75	.59	44	78	.58	45
	Nov.	59	.63	37	61	.62	38
	Dec.	44	.68	30	46	.67	31
	Total	1,926	.37	714	1,909	.38	726
1948	Jan.	38	.71	27	38	.71	27
	Feb.	33	.73	24	33	.73	24
	March	64	.62	40	64	.62	40
	April	95	.54	51	95	.54	51
	May	187	.43	80	186	.44	81
	June	396	.31	123	395	.32	125
	July	121	.39	47	120	.41	49
	Aug.	56	.52	29	55	.56	31
	Sept.	32	.62	20	32	.69	22
	Oct.	36	.72	26	37	.73	27
	Nov.	29	.76	22	29	.79	23
	Dec.	26	.81	21	26	.85	22
	Total	1,113	.46	510	1,110	.47	522
1949	Jan.	27	.78	21	27	.78	21
	Feb.	24	.79	19	24	.79	19
	March	45	.69	31	45	.69	31
	April	104	.52	54	104	.52	54
	May	211	.41	86	203	.43	87
	June	372	.32	119	359	.34	121
	July	179	.36	64	168	.39	66
	Aug.	65	.48	31	60	.55	33
	Sept.	38	.58	22	37	.65	24
	Oct.	52	.65	34	57	.61	35
	Nov.	54	.65	35	58	.62	36
	Dec.	34	.74	25	37	.70	26
	Total	1,205	.45	541	1,179	.47	553
1950	Jan.	29	.79	23	29	.79	23
	Feb.	33	.73	24	33	.73	24
	March	102	.53	54	102	.53	54
	April	251	.38	95	251	.38	95
	May	270	.37	100	259	.39	101
	June	582	.34	200	564	.36	202
	July	427	.23	98	411	.24	100
	Aug.	140	.37	52	132	.41	54
	Sept.	76	.45	34	75	.48	36
	Oct.	66	.61	40	73	.56	41
	Nov.	71	.59	42	76	.57	43
	Dec.	49	.65	32	53	.62	33
	Total	2,096	.38	794	2,058	.39	806
1951	Jan.	34	.74	25	34	.74	25
	Feb.	47	.66	31	47	.66	31
	March	70	.59	41	70	.59	41
	April	154	.45	69	154	.45	69
	May	317	.35	111	311	.36	112
	June	528	.28	148	519	.29	150
	July	349	.25	87	342	.26	89
	Aug.	208	.28	58	204	.29	60
	Sept.	91	.43	39	91	.45	41
	Oct.	81	.53	43	84	.52	44
	Nov.	50	.68	34	53	.66	35
	Dec.	43	.70	30	45	.69	31
	Total	1,972	.36	716	1,954	.37	728
1952	Jan.	41	.63	26	41	.63	26
	Feb.	42	.62	26	42	.62	26
	March	52	.63	33	52	.63	33
	April	190	.52	99	190	.52	99
	May	348	.32	111	346	.32	112
	June	399	.27	108	395	.28	110
	July	171	.33	56	167	.35	58
	Aug.	99	.38	38	97	.41	40
	Sept.	57	.51	29	57	.54	31
	Oct.	42	.64	27	43	.65	28
	Nov.	28	.82	23	29	.83	24
	Dec.	27	.78	21	28	.79	22
	Total	1,496	.40	597	1,487	.41	609

Table I

Colorado River Basin

Flow and Quality of Water Data

Green River near Green River, Wyoming

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1953	Jan.	32	0.69	22	32	0.69	22
	Feb.	33	.70	23	33	.70	23
	March	44	.68	30	44	.68	30
	April	77	.58	45	77	.58	45
	May	74	.57	42	70	.61	43
	June	381	.28	107	374	.29	109
	July	206	.29	60	200	.31	62
	Aug.	104	.39	41	101	.43	43
	Sept.	39	.56	22	39	.62	24
	Oct.	34	.74	25	36	.72	26
	Nov.	36	.75	27	38	.74	28
	Dec.	24	.88	21	26	.85	22
	Total	1,084	.43	465	1,070	.45	477
1954	Jan.	26	.81	21	26	.81	21
	Feb.	27	.74	20	27	.74	20
	March	48	.67	32	48	.67	32
	April	88	.55	48	88	.55	48
	May	282	.28	79	276	.29	80
	June	232	.30	70	221	.33	72
	July	250	.25	62	241	.27	64
	Aug.	86	.40	34	82	.44	36
	Sept.	47	.55	26	46	.61	28
	Oct.	40	.68	27	44	.64	28
	Nov.	39	.69	27	42	.67	28
	Dec.	18	.89	16	20	.85	17
	Total	1,183	.39	462	1,161	.41	474
1955	Jan.	20	.80	16	20	.80	16
	Feb.	20	.80	16	20	.80	16
	March	33	.76	25	33	.76	25
	April	74	.59	44	74	.59	44
	May	127	.39	50	122	.42	51
	June	245	.27	66	236	.28	67
	July	116	.36	42	107	.41	44
	Aug.	68	.41	28	64	.47	30
	Sept.	35	.57	20	34	.62	21
	Oct.	33	.70	23	36	.67	24
	Nov.	28	.79	22	31	.74	23
	Dec.	39	.74	29	41	.73	30
	Total	837	.46	381	817	.48	391
1956	Jan.	42	.69	29	42	.69	29
	Feb.	29	.66	19	29	.66	19
	March	91	.56	51	91	.56	51
	April	158	.45	71	158	.45	71
	May	310	.37	115	298	.39	116
	June	555	.25	139	534	.26	141
	July	197	.31	61	179	.35	63
	Aug.	98	.38	37	89	.44	39
	Sept.	41	.56	23	40	.60	24
	Oct.	39	.59	23	46	.52	24
	Nov.	35	.69	24	41	.61	25
	Dec.	26	.77	20	31	.68	21
	Total	1,621	.38	612	1,578	.39	623
1957	Jan.	22	.77	17	22	.77	17
	Feb.	37	.70	26	37	.70	26
	March	57	.68	39	57	.69	39
	April	60	.62	37	60	.62	37
	May	176	.46	81	173	.47	81
	June	476	.27	129	470	.28	130
	July	380	.25	95	374	.26	96
	Aug.	117	.35	41	114	.37	42
	Sept.	68	.47	32	68	.48	33
	Oct.	66	.55	36	68	.54	37
	Nov.	48	.67	32	50	.66	33
	Dec.	41	.71	29	42	.71	30
	Total	1,548	.38	594	1,535	.39	601
1958	Jan.	33	.76	25	33	.76	25
	Feb.	47	.66	31	47	.66	31
	March	51	.63	32	51	.63	32
	April	99	.56	55	99	.56	55
	May	291	.31	90	290	.31	90
	June	266	.31	83	264	.32	84
	July	76	.45	34	74	.47	35
	Aug.	51	.53	27	50	.56	28
	Sept.	36	.64	23	36	.67	24
	Oct.	33	.79	26	34	.76	26
	Nov.	32	.78	25	33	.76	25
	Dec.	31	.74	23	31	.74	23
	Total	1,046	.45	474	1,042	.46	478
1959	Jan.	24	0.71	17	24	0.71	17
	Feb.	25	.72	18	25	.72	18
	March	49	.65	32	49	.65	32
	April	73	.64	47	73	.64	47
	May	79	.51	40	79	.51	40
	June	322	.26	84	322	.26	84
	July	140	.34	48	140	.34	48
	Aug.	79	.40	32	79	.40	32
	Sept.	42	.55	23	42	.55	23
	Oct.	51	.57	29	51	.57	29
	Nov.	42	.60	25	42	.60	25
	Dec.	27	.74	20	27	.74	20
	Total	953	.44	415	953	.44	415
1960	Jan.	27	.74	20	27	.74	20
	Feb.	23	.78	18	23	.78	18
	March	75	.53	40	75	.53	40
	April	84	.49	41	84	.49	41
	May	66	.48	32	66	.48	32
	June	173	.30	52	173	.30	52
	July	68	.43	29	68	.43	29
	Aug.	38	.45	17	38	.45	17
	Sept.	28	.54	15	28	.54	15
	Oct.	42	.57	24	42	.57	24
	Nov.	47	.49	23	47	.49	23
	Dec.	27	.69	18	27	.69	18
	Total	698	.47	329	698	.47	329
1961	Jan.	20	.60	12	20	.60	12
	Feb.	19	.58	11	19	.58	11
	March	30	.57	17	30	.57	17
	April	50	.60	30	50	.60	30
	May	60	.43	26	60	.43	26
	June	162	.27	44	162	.27	44
	July	47	.43	20	47	.43	20
	Aug.	35	.43	15	35	.43	15
	Sept.	39	.46	18	39	.46	18
	Oct.	41	.51	21	41	.51	21
	Nov.	29	.52	15	29	.52	15
	Dec.	27	.52	14	27	.52	14
	Total	559	.43	243	559	.43	243

ANNUAL SUMMARY

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	1,109	0.48	527	1,104	0.49	539
1942	1,154	.45	518	1,147	.46	530
1943	1,680	.38	641	1,673	.39	653
1944	1,265	.42	536	1,257	.44	548
1945	1,150	.45	519	1,142	.46	531
1946	1,225	.46	564	1,214	.47	576
1947	1,926	.37	714	1,909	.38	726
1948	1,113	.46	510	1,110	.47	522
1949	1,205	.45	541	1,179	.47	553
1950	2,096	.38	794	2,058	.39	806
1951	1,972	.36	716	1,954	.37	728
1952	1,496	.40	597	1,487	.41	609
1953	1,084	.43	465	1,070	.45	477
1954	1,183	.39	462	1,161	.41	474
1955	837	.46	381	817	.48	391
1956	1,621	.38	612	1,578	.39	623
1957	1,548	.38	594	1,535	.39	601
1958	1,046	.45	474	1,042	.46	478
1959	953	.44	415	953	.44	415
1960	698	.47	329	698	.47	329
1961	559	.43	243	559	.43	243
Total	26,920		11,152	26,647		11,352
Average	1,282	0.41	531	1,269	0.43	541

Sampled quality record May 1951 to Dec. 1961; remainder by correlation.

Measured flow record Jan. 1941 to Sept. 1945; and Apr. 1951 to Dec. 1961; remainder by correlation.

Table 2

Colorado River Basin

Flow and Quality of Water Data

Green River near Greendale, Utah

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	27	0.93	25	27	0.93	25
	Feb.	25	1.16	29	25	1.16	29
	March	72	.94	68	72	.94	68
	April	131	.56	74	131	.56	74
	May	276	.58	160	274	.59	161
	June	441	.40	175	438	.40	177
1941	July	171	.55	94	169	.57	96
	Aug.	110	.73	80	110	.75	82
	Sept.	67	.78	52	67	.81	54
	Oct.	94	.97	91	95	.97	92
	Nov.	71	.93	66	72	.93	67
	Dec.	36	1.19	43	36	1.22	44
	Total	1,521	.63	957	1,516	0.64	969
	Jan.	30	1.00	30	30	1.00	30
	Feb.	31	1.00	31	31	1.00	31
	March	69	1.07	74	69	1.07	74
	April	261	.65	170	261	.65	170
	May	235	.76	180	234	.77	181
	June	434	.44	193	431	.45	195
1942	July	239	.40	97	236	.42	99
	Aug.	73	.57	42	71	.62	44
	Sept.	40	.72	29	39	.79	31
	Oct.	36	1.00	36	37	1.00	37
	Nov.	35	1.17	41	36	1.17	42
	Dec.	34	1.06	36	35	1.06	37
	Total	1,517	.63	959	1,510	.64	971
	Jan.	33	1.09	36	33	1.09	36
	Feb.	37	.97	36	37	.97	36
	March	96	.74	71	96	.74	71
	April	262	.48	125	262	.48	125
	May	338	.38	130	337	.39	131
	June	552	.33	182	549	.34	184
1943	July	393	.29	115	390	.30	117
	Aug.	163	.47	76	161	.48	78
	Sept.	64	.56	36	63	.60	38
	Oct.	60	.72	43	61	.72	44
	Nov.	54	.83	45	55	.84	46
	Dec.	37	.89	33	38	.89	34
	Total	2,089	.44	928	2.082	.45	940
	Jan.	30	.93	28	30	.93	28
	Feb.	32	1.00	32	32	1.00	32
	March	48	1.48	71	48	1.48	71
	April	345	.55	190	345	.55	190
	May	245	.58	142	243	.59	143
	June	469	.37	174	466	.38	176
1944	July	278	.39	109	275	.40	111
	Aug.	76	.49	37	74	.53	39
	Sept.	36	.61	22	35	.68	24
	Oct.	47	.83	39	48	.83	40
	Nov.	39	.92	36	40	.92	37
	Dec.	27	.85	23	28	.86	24
	Total	1,672	.54	903	1,664	.55	915
	Jan.	29	.97	28	29	.97	28
	Feb.	34	.94	32	34	.94	32
	March	65	.88	57	65	.88	57
	April	113	.70	79	113	.70	79
	May	176	.60	105	174	.61	106
	June	310	.46	144	307	.48	146
1945	July	325	.37	120	322	.38	122
	Aug.	174	.47	82	172	.49	84
	Sept.	103	.43	44	102	.45	46
	Oct.	74	.74	55	75	.75	56
	Nov.	52	.88	46	53	.89	47
	Dec.	42	.81	34	43	.81	35
	Total	1,497	.55	826	1,489	.56	838
	Jan.	39	.90	35	39	.90	35
	Feb.	33	.85	28	33	.85	28
	March	88	.67	59	88	.67	59
	April	237	.48	115	237	.48	115
	May	298	.44	130	295	.44	131
	June	354	.37	133	349	.39	135
1946	July	162	.40	64	158	.42	66
	Aug.	81	.57	46	78	.62	48
	Sept.	62	.60	37	62	.63	39
	Oct.	68	.76	52	70	.76	53
	Nov.	63	.82	52	64	.83	53
	Dec.	62	.77	48	63	.78	49
	Total	1,547	.52	799	1,536	53	811

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	32	0.81	26	32	0.81	26
	Feb.	37	.89	33	37	.89	33
	March	195	.62	120	195	.62	120
	April	136	.62	84	136	.61	84
	May	521	.40	210	516	.41	211
	June	628	.36	225	620	.37	227
1947	July	372	.35	131	365	.36	133
	Aug.	218	.45	99	214	.47	101
	Sept.	91	.53	48	91	.55	50
	Oct.	80	.70	63	93	.69	64
	Nov.	71	.77	55	73	.77	56
	Dec.	56	.87	49	58	.86	50
	Total	2,447	.47	1,143	2,430	.48	1,155
	Jan.	47	.91	43	47	.91	43
	Feb.	40	.88	35	40	.88	35
	March	102	.79	81	102	.79	81
	April	157	.70	110	157	.70	110
	May	336	.38	126	335	.38	127
	June	454	.36	162	453	.36	164
1948	July	126	.50	63	125	.52	65
	Aug.	59	.56	33	58	.60	35
	Sept.	33	.76	25	33	.82	27
	Oct.	39	.77	30	40	.77	31
	Nov.	34	.85	29	34	.88	30
	Dec.	31	1.00	31	31	1.03	32
	Total	1,458	.53	768	1,455	.54	780
	Jan.	31	.90	28	31	.90	28
	Feb.	29	.93	27	29	.93	27
	March	73	.89	65	73	.89	65
	April	152	.69	105	152	.69	105
	May	310	.53	165	302	.55	166
	June	493	.47	230	478	.49	232
1949	July	205	.52	106	194	.56	108
	Aug.	72	.61	44	69	.67	46
	Sept.	42	.74	31	41	.80	33
	Oct.	70	.93	65	75	.88	66
	Nov.	66	.97	64	70	.93	65
	Dec.	40	.97	39	43	.93	40
	Total	1,583	.61	969	1,557	.63	981
	Jan.	36	1.19	43	36	1.19	43
	Feb.	45	.95	43	45	.95	43
	March	150	.61	92	150	.61	92
	April	323	.46	150	323	.46	150
	May	416	.46	190	405	.47	191
	June	741	.37	275	723	.38	277
1950	July	458	.34	154	441	.35	156
	Aug.	153	.51	78	146	.55	80
	Sept.	86	.62	53	85	.65	55
	Oct.	76	.72	55	83	.67	56
	Nov.	80	.75	60	85	.72	61
	Dec.	61	.84	51	65	.80	52
	Total	2,625	.47	1,244	2,587	.49	1,256
	Jan.	45	.80	36	45	.80	36
	Feb.	61	.82	50	61	.82	50
	March	93	.78	73	93	.78	73
	April	212	.47	100	212	.47	100
	May	395	.45	177	389	.46	178
	June	626	.36	225	617	.37	227
1951	July	366	.36	132	359	.37	134
	Aug.	228	.44	101	224	.46	103
	Sept.	98	.56	55	98	.58	57
	Oct.	99	.71	70	102	.70	71
	Nov.	57	.91	52	60	.88	53
	Dec.	54	.87	47	56	.86	48
	Total	2,334	.48	1,118	2,316	.49	1,130
	Jan.	49	.82	40	49	.82	40
	Feb.	52	.81	42	52	.81	42
	March	63	.75	47	63	.75	47
	April	318	.62	198	318	.62	198
	May	600	.39	235	598	.39	236
	June	554	.36	201	550	.37	203
1952	July	205	.56	114	201	.58	116
	Aug.	121	.60	72	119	.62	74
	Sept.	67	.67	45	67	.70	47
	Oct.	49	.86	42	50	.86	43
	Nov.	37	1.11	41	38	1.10	42
	Dec.	34	1.18	40	35	1.17	41
	Total	2,149	.52	1,117	2,140	.53	1,129

Table 2

Colorado River Basin

Flow and Quality of Water Data

Green River near Greendale, Utah

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	48	0.81	39	48	0.81	39
	Feb.	48	.85	41	48	.85	41
	March	73	.86	63	73	.86	63
	April	96	.76	73	96	.76	73
	May	110	.64	70	106	.67	71
	June	452	.39	175	445	.40	177
1953	July	198	.39	77	192	.41	79
	Aug.	105	.54	57	102	.58	59
	Sept.	43	.63	27	43	.67	29
	Oct.	35	.89	31	37	.86	32
	Nov.	42	.98	41	44	.95	42
	Dec.	32	.97	31	34	.94	32
	Total	1,282	.57	725	1,268	.58	737
	Jan.	28	1.11	31	28	1.11	31
	Feb.	39	.87	34	39	.87	34
	March	62	.81	50	62	.81	50
	April	101	.65	66	101	.65	66
	May	302	.31	94	296	.32	95
	June	223	.36	81	212	.39	83
1954	July	265	.28	73	256	.29	75
	Aug.	81	.43	35	77	.48	37
	Sept.	45	.69	31	44	.75	33
	Oct.	42	.95	40	46	.89	41
	Nov.	41	.85	35	44	.82	36
	Dec.	20	1.05	21	22	1.00	22
	Total	1,249	.47	591	1,227	.49	603
	Jan.	24	.75	18	24	.75	18
	Feb.	24	.71	17	24	.71	17
	March	44	1.11	49	44	1.11	49
	April	106	.64	68	106	.64	68
	May	168	.52	88	163	.55	89
	June	288	.33	95	275	.35	96
1955	July	130	.38	49	124	.41	51
	Aug.	80	.52	42	77	.57	44
	Sept.	38	.58	22	37	.62	23
	Oct.	38	.68	26	41	.66	27
	Nov.	36	.75	27	39	.72	28
	Dec.	45	.82	37	47	.81	38
	Total	1,021	.53	538	1,001	.55	548
	Jan.	50	.86	43	50	.86	43
	Feb.	38	.76	29	38	.76	29
	March	150	.47	70	150	.47	70
	April	203	.43	87	203	.43	87
	May	368	.39	144	351	.41	145
	June	615	.29	178	583	.31	180
1956	July	207	.33	69	200	.35	71
	Aug.	104	.42	44	100	.46	46
	Sept.	48	.44	21	47	.47	22
	Oct.	46	.74	34	53	.66	35
	Nov.	39	.82	32	45	.73	33
	Dec.	26	.88	23	31	.77	24
	Total	1,894	.41	774	1,851	.42	785
	Jan.	28	.86	24	28	.86	24
	Feb.	43	.79	34	43	.79	34
	March	66	.91	60	66	.91	60
	April	86	.67	58	86	.67	58
	May	275	.54	148	272	.54	148
	June	685	.37	251	679	.37	252
1957	July	433	.36	155	427	.37	156
	Aug.	142	.57	81	139	.59	82
	Sept.	82	.58	48	82	.60	49
	Oct.	77	.69	53	79	.68	54
	Nov.	57	1.00	57	59	.98	58
	Dec.	46	.91	42	47	.91	43
	Total	2,020	.50	1,011	2,007	.51	1,018
	Jan.	43	.77	33	43	.77	33
	Feb.	55	.80	44	55	.80	44
	March	66	.71	47	66	.71	47
	April	134	.67	90	134	.67	90
	May	387	.39	151	386	.39	151
	June	338	.38	127	336	.38	128
1958	July	88	.50	44	86	.52	45
	Aug.	57	.56	32	56	.59	33
	Sept.	39	.69	27	39	.72	28
	Oct.	36	.72	26	37	.70	26
	Nov.	34	.70	24	35	.68	24
	Dec.	38	.84	32	38	.84	32
	Total	1,315	.51	677	1,311	.52	681
	Jan.	29	0.86	25	Same as historical		
	Feb.	32	.91	29			
	March	65	.92	60			
	April	98	.71	70			
	May	115	.57	66			
	June	368	.36	132			
1959	July	176	.51	90			
	Aug.	93	.47	44			
	Sept.	58	.79	46			
	Oct.	68	.72	49			
	Nov.	51	.76	39			
	Dec.	37	.99	37			
	Total	1,190	.58	687			
	Jan.	26	.81	21			
	Feb.	29	.86	25			
	March	149	.70	104			
	April	140	.55	77			
	May	127	.48	74			
	June	216	.43	93			
1960	July	78	.49	38			
	Aug.	43	.47	20			
	Sept.	35	.56	20			
	Oct.	49	.65	32			
	Nov.	54	.67	36			
	Dec.	27	.84	23			
	Total	973	.58	563			
	Jan.	27	.73	20			
	Feb.	27	.77	21			
	March	64	.86	55			
	April	76	.69	52			
	May	79	.59	47			
	June	192	.32	61			
1961	July	56	.44	25			
	Aug.	43	.58	25			
	Sept.	55	.68	37			
	Oct.	64	.70	45			
	Nov.	54	.70	38			
	Dec.	44	.78	34			
	Total	781	.59	460			

ANNUAL SUMMARY

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	1,521	0.63	957	1,516	0.64	[illegible]
1942	1,517	.63	959	1,510	.64	[illegible]
1943	2,089	.44	928	2,082	.45	[illegible]
1944	1,672	.54	903	1,664	.55	[illegible]
1945	1,497	.55	826	1,489	.56	838
1946	1,547	.52	799	1,536	.53	[illegible]
1947	2,447	.47	1,143	2,430	.48	[illegible]
1948	1,458	.53	768	1,455	.54	[illegible]
1949	1,583	.61	969	1,557	.63	[illegible]
1950	2,625	.47	1,244	2,587	.49	1,256
1951	2,334	.48	1,118	2,316	.49	[illegible]
1952	2,149	.52	1,117	2,140	.53	[illegible]
1953	1,282	.57	725	1,268	.58	[illegible]
1954	1,249	.47	591	1,227	.49	[illegible]
1955	1,021	.53	538	1,001	[illegible]	[illegible]
1956	1,894	.41	774	1,851	.42	[illegible]
1957	2,020	.50	1,011	2,007	.51	1,018
1958	1,315	.51	677	1,311	.52	[illegible]
1959	1,190	.58	687	1,190	[illegible]	[illegible]
1960	973	.58	563	973	.58	[illegible]
1961	781	.59	460	781	.59	460
Total	34,164		17,757	[illegible]		17,957
Average	1,627	0.52	846	[illegible]	[illegible]	855

Sampled quality record October 1956 to December 1961 (fragmentary); remainder by correlation.

Measured flow record entire period.

Table 3

Colorado River Basin

Flow and Quality of Water Data

Duchesne River near Randlett, Utah

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	25	1.12	28	25	1.12	28
	Feb.	24	1.29	31	24	1.29	31
	March	21	1.71	36	21	1.71	36
	April	20	1.50	30	17	1.76	30
	May	155	.50	78	139	.56	78
	June	232	.38	88	214	.41	87
1941	July	35	1.11	39	30	1.30	39
	Aug.	18	1.50	27	16	1.69	27
	Sept.	15	1.60	24	13	1.85	24
	Oct.	54	.93	50	53	.94	50
	Nov.	51	.90	46	50	.92	46
	Dec.	44	1.04	46	44	1.04	46
	Total	694	.75	523	646	.81	522
	Jan.	40	.90	36	40	.90	36
	Feb.	39	1.00	39	39	1.00	39
	March	39	1.23	48	39	1.23	48
	April	50	.90	45	48	.94	45
	May	83	.72	60	71	.85	60
	June	171	.46	79	158	.49	78
1942	July	23	1.43	33	19	1.74	33
	Aug.	8	2.12	17	7	2.42	17
	Sept.	5	2.40	12	4	3.00	12
	Oct.	18	1.50	27	17	1.59	27
	Nov.	22	1.41	31	21	1.48	31
	Dec.	28	1.28	36	28	1.28	36
	Total	526	.88	463	491	.94	462
	Jan.	26	1.12	29	26	1.12	29
	Feb.	29	1.17	34	29	1.17	34
	March	29	1.51	44	29	1.52	44
	April	43	1.00	43	40	1.07	43
	May	100	.64	64	85	.75	64
	June	103	.62	64	86	.73	63
1943	July	28	1.21	34	23	1.48	34
	Aug.	23	1.39	32	21	1.52	32
	Sept.	8	2.00	16	6	2.67	16
	Oct.	22	1.40	31	21	1.48	31
	Nov.	24	1.29	31	23	1.35	31
	Dec.	25	1.28	32	25	1.28	32
	Total	460	.99	454	414	1.09	453
	Jan.	23	1.08	25	23	1.09	25
	Feb.	26	1.31	34	26	1.31	34
	March	43	1.20	52	43	1.21	52
	April	48	.94	45	45	1.00	45
	May	128	.57	73	113	.65	73
	June	255	.37	94	237	.39	93
1944	July	82	.72	59	77	.77	59
	Aug.	8	2.00	16	6	2.67	16
	Sept.	7	2.14	15	5	3.00	15
	Oct.	24	1.37	33	23	1.43	33
	Nov.	26	1.30	34	25	1.36	34
	Dec.	28	1.32	37	28	1.32	37
	Total	698	.74	517	651	.79	516
	Jan.	30	1.00	30	30	1.00	30
	Feb.	27	1.18	32	27	1.18	32
	March	32	1.40	45	32	1.41	45
	April	24	1.29	31	22	1.41	31
	May	59	.86	51	46	1.11	51
	June	91	.67	61	77	.78	60
1945	July	30	1.23	37	26	1.42	37
	Aug.	31	1.19	37	29	1.27	37
	Sept.	12	1.75	21	11	1.91	21
	Oct.	21	1.38	29	20	1.45	29
	Nov.	26	1.27	33	25	1.32	33
	Dec.	24	1.37	33	24	1.37	33
	Total	407	1.08	440	369	1.19	439
	Jan.	23	1.13	26	23	1.13	26
	Feb.	21	1.38	29	21	1.38	29
	March	29	1.41	41	29	1.41	41
	April	40	1.00	40	38	1.05	40
	May	70	.79	55	57	.96	55
	June	47	.95	45	31	1.42	44
1946	July	5	2.60	13	3	4.33	13
	Aug.	6	2.33	14	5	2.80	14
	Sept.	4	2.75	11	3	3.67	11
	Oct.	17	1.53	26	16	1.62	26
	Nov.	32	1.22	39	31	1.26	39
	Dec.	30	1.20	36	30	1.20	36
	Total	324	1.16	375	287	1.30	374
	Jan.	26	1.07	28	26	1.08	28
	Feb.	36	1.08	39	36	1.08	39
	March	36	1.27	46	36	1.28	46
	April	23	1.30	30	20	1.50	30
	May	143	.53	76	127	.60	76
	June	158	.49	78	140	.55	77
1947	July	33	1.18	39	28	1.39	39
	Aug.	25	1.28	32	23	1.39	32
	Sept.	12	1.75	21	10	2.10	21
	Oct.	17	1.65	28	16	1.75	28
	Nov.	29	1.21	35	28	1.25	35
	Dec.	31	1.19	37	31	1.19	37
	Total	569	.86	489	521	.94	488
	Jan.	29	1.00	29	29	1.00	29
	Feb.	26	1.31	34	26	1.31	34
	March	40	1.20	48	40	1.20	48
	April	31	1.23	38	29	1.31	38
	May	70	.79	55	59	.93	55
	June	51	.92	47	37	1.24	46
1948	July	3	3.00	9	2	4.50	9
	Aug.	2	3.50	7	2	3.50	7
	Sept.	1	3.00	3	0	0	0
	Oct.	5	2.40	12	4	3.00	12
	Nov.	14	1.71	24	13	1.85	24
	Dec.	26	1.27	33	26	1.27	33
	Total	298	1.14	339	267	1.25	335
	Jan.	24	1.08	26	24	1.08	26
	Feb.	23	1.30	30	23	1.30	30
	March	44	1.20	53	44	1.20	53
	April	46	.98	45	43	1.05	45
	May	127	.56	71	111	.64	71
	June	230	.39	90	212	.42	89
1949	July	50	.94	47	44	1.07	47
	Aug.	7	2.14	15	5	3.00	15
	Sept.	8	2.13	17	6	2.83	17
	Oct.	25	1.28	32	24	1.33	32
	Nov.	29	1.21	35	28	1.25	35
	Dec.	28	1.29	36	28	1.29	36
	Total	641	.78	497	592	.84	496
	Jan.	31	1.00	31	31	1.00	31
	Feb.	26	1.23	32	26	1.23	32
	March	40	1.30	52	40	1.30	52
	April	44	1.00	44	40	1.10	44
	May	97	.67	65	79	.81	64
	June	193	.43	83	173	.47	82
1950	July	45	1.00	45	40	1.12	45
	Aug.	9	2.00	18	7	2.57	18
	Sept.	13	1.77	23	11	2.09	23
	Oct.	16	1.56	25	14	1.78	25
	Nov.	27	1.26	34	25	1.36	34
	Dec.	33	1.36	45	33	1.36	45
	Total	574	.87	497	519	.95	495
	Jan.	26	1.00	26	26	1.00	26
	Feb.	26	1.31	34	26	1.31	34
	March	23	1.56	36	23	1.56	36
	April	14	1.71	24	10	2.40	24
	May	79	.75	59	62	.94	58
	June	124	.73	91	105	.86	90
1951	July	31	1.29	40	26	1.54	40
	Aug.	26	1.46	38	24	1.58	38
	Sept.	10	1.90	19	9	2.11	19
	Oct.	25	1.28	32	24	1.33	32
	Nov.	32	1.22	39	31	1.26	39
	Dec.	32	1.22	39	32	1.22	39
	Total	448	1.06	477	398	1.19	475
	Jan.	28	1.07	30	28	1.07	30
	Feb.	26	1.31	34	26	1.31	34
	March	31	1.42	44	31	1.42	44
	April	111	.60	67	1.06	.63	67
	May	304	.34	103	281	.36	102
	June	302	.33	100	276	.36	99
1952	July	70	.79	55	63	.87	55
	Aug.	49	.94	46	45	1.02	46
	Sept.	30	1.20	36	28	1.28	36
	Oct.	21	1.38	29	19	1.53	29
	Nov.	26	1.31	34	24	1.42	34
	Dec.	37	1.11	41	37	1.11	41
	Total	1035	.60	619	964	.64	617

Table 3

Colorado River Basin

Flow and Quality of Water Data

Duchesne River near Randlett, Utah

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	39	0.90	35	39	0.95	35
	Feb.	33	1.12	37	33	1.12	37
	March	34	1.41	48	34	1.41	48
	April	13	1.77	23	8	3.00	23
	May	15	1.60	24	5	4.80	24
	June	107	.60	64	94	.67	63
1953	July	13	1.77	23	9	2.56	23
	Aug.	12	1.75	21	11	1.91	21
	Sept.	5	2.20	11	4	2.75	11
	Oct.	9	2.00	18	8	2.25	18
	Nov.	20	1.40	28	19	1.47	28
	Dec.	26	1.31	34	26	1.31	34
	Total	326	1.12	366	290	1.26	365
	Jan.	27	1.11	30	Same as historical		
	Feb.	25	1.28	32			
	March	20	1.80	36			
	April	13	1.77	23			
	May	36	1.11	40			
	June	5	2.40	12			
1954	July	2	3.00	6			
	Aug.	1	4.00	4			
	Sept.	6	2.33	14			
	Oct.	17	1.59	27			
	Nov.	18	1.50	27			
	Dec.	18	1.50	27			
	Total	188	1.48	278			
	Jan.	25	1.08	27			
	Feb.	21	1.43	30			
	March	34	1.38	47			
	April	22	1.41	31			
	May	45	1.00	45			
	June	34	1.09	37			
1955	July	2	3.00	6			
	Aug.	8	2.50	17			
	Sept.	4	2.50	10			
	Oct.	6	2.33	14			
	Nov.	15	1.60	24			
	Dec.	29	1.21	35			
	Total	245	1.32	323			
	Jan.	27	1.00	27			
	Feb.	23	1.35	31			
	March	25	1.60	40			
	April	17	1.59	27			
	May	74	.76	56			
	June	90	.68	61			
1956	July	4	2.75	11			
	Aug.	2	4.00	8			
	Sept.	1	5.00	5			
	Oct.	4	2.25	9			
	Nov.	17	1.59	27			
	Dec.	19	1.21	23			
	Total	303	1.07	325			
	Jan.	21	1.05	22			
	Feb.	20	1.05	21			
	March	22	1.54	34			
	April	12	1.83	22			
	May	39	1.23	48			
	June	184	.41	76			
1957	July	35	.91	32			
	Aug.	18	1.61	29			
	Sept.	15	1.47	22			
	Oct.	19	1.74	33			
	Nov.	41	1.41	58			
	Dec.	30	1.07	32			
	Total	456	.94	429			
	Jan.	29	.83	24			
	Feb.	31	1.00	31			
	March	35	1.37	48			
	April	29	1.07	31			
	May	141	.46	65			
	June	103	.42	43			
1958	July	4	2.50	10			
	Aug.	1	4.00	4			
	Sept.	3	2.33	7			
	Oct.	5	2.60	13			
	Nov.	14	1.93	27			
	Dec.	21	1.24	26			
	Total	416	.79	329			

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	22	1.14	25	Same as historical		
	Feb.	24	1.04	25			
	March	17	1.29	22			
	April	5	2.00	10			
	May	4	2.75	11			
	June	34	.85	29			
1959	July	6	2.00	12			
	Aug.	4	2.75	11			
	Sept.	4	2.50	10			
	Oct.	11	1.54	17			
	Nov.	13	1.54	20			
	Dec.	22	1.32	29			
	Total	166	1.33	221			
	Jan.	23	.87	20			
	Feb.	23	.83	19			
	March	27	1.15	31			
	April	8	1.62	13			
	May	18	1.17	21			
	June	23	.91	21			
1960	July	1	4.00	4			
	Aug.	1	4.00	4			
	Sept.	1	4.00	4			
	Oct.	5	2.40	12			
	Nov.	12	1.58	19			
	Dec.	18	1.33	24			
	Total	160	1.20	192			
	Jan.	21	1.19	25			
	Feb.	19	1.47	28			
	March	10	1.50	15			
	April	2	3.50	7			
	May	3	2.33	7			
	June	3	2.67	8			
1961	July	1	4.00	4			
	Aug.	1	3.00	3			
	Sept.	13	1.15	15			
	Oct.	19	1.47	28			
	Nov.	27	1.11	30			
	Dec.	26	1.00	26			
	Total	145	1.35	196			

ANNUAL SUMMARY

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	694	0.75	523	646	0.81	522
1942	526	.88	463	491	.94	462
1943	460	.99	454	414	1.09	453
1944	698	.74	517	651	.79	516
1945	407	1.08	440	369	1.19	439
1946	324	1.16	375	287	1.30	374
1947	569	.86	489	521	.94	488
1948	298	1.14	339	267	1.25	335
1949	641	.78	497	592	.84	496
1950	574	.87	497	519	.95	495
1951	448	1.06	477	398	1.19	475
1952	1,035	.60	619	964	.64	617
1953	326	1.12	366	290	1.26	365
1954	188	1.48	278	188	1.48	278
1955	245	1.32	323	245	1.32	323
1956	303	1.07	325	303	1.07	325
1957	456	.94	429	456	.94	429
1958	416	.79	329	416	.79	329
1959	166	1.33	221	166	1.33	221
1960	160	1.20	192	160	1.20	192
1961	145	1.35	196	145	1.35	196
Total	9,079		8,349	8,488		8,330
Average	432	0.92	398	404	0.98	397

Sampled quality record December 1950 to September 1951, November 1956 to December 1961; remainder by correlation.

Measured flow record October 1942 to December 1961; remainder by correlation.

Table 4
Colorado River Basin
Flow and Quality of Water Data
Green River near Ouray, Utah

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	93	0.95	88	93	0.95	88
	Feb.	111	.97	108	111	.97	108
	March	202	.90	182	202	.90	182
	April	316	.64	202	313	.65	202
	May	1,200	.42	500	1,179	.43	502
	June	1,140	.37	420	1,116	.38	423
1941	July	333	.58	195	323	.62	199
	Aug.	245	.98	240	240	1.02	244
	Sept.	158	.95	150	156	.99	154
	Oct.	284	.93	265	285	.94	267
	Nov.	214	.85	182	215	.85	184
	Dec.	151	.92	139	152	.93	141
	Total	4,447	.60	2,671	4,385	.61	2,694
	Jan.	110	.88	97	110	.88	97
	Feb.	113	.91	103	113	.91	103
	March	247	.91	225	247	.91	225
	April	840	.58	483	838	.58	483
	May	1,030	.47	485	1,015	.48	487
1942	June	1,250	.34	420	1,232	.34	422
	July	395	.51	200	385	.53	204
	Aug.	138	.74	102	133	.80	106
	Sept.	82	.96	79	78	1.05	82
	Oct.	108	.99	107	109	1.00	109
	Nov.	113	1.09	123	114	1.10	125
	Dec.	109	1.10	120	111	1.10	122
	Total	4,535	.56	2,544	4,485	.57	2,565
	Jan.	98	1.09	107	98	1.09	107
	Feb.	119	.91	108	119	.91	108
	March	227	.81	183	227	.81	183
	April	573	.51	290	570	.51	290
	May	820	.34	275	802	.34	276
1943	June	1,090	.36	392	1,068	.37	394
	July	591	.38	223	581	.39	227
	Aug.	278	.76	210	272	.78	213
	Sept.	109	.84	92	105	.90	95
	Oct.	115	.96	111	116	.97	113
	Nov.	132	1.00	132	133	1.01	134
	Dec.	105	1.04	109	107	1.04	111
	Total	4,257	.52	2,232	4,198	.54	2,251
	Jan.	79	1.05	83	79	1.05	83
	Feb.	101	1.03	104	101	1.03	104
	March	210	1.08	226	210	1.08	226
	April	535	.68	365	532	.69	365
	May	970	.39	380	951	.40	382
	June	1,390	.28	395	1,367	.29	397
1944	July	572	.39	222	561	.40	226
	Aug.	128	.63	80	122	.69	84
	Sept.	68	.78	53	63	.89	56
	Oct.	107	.95	102	108	.96	104
	Nov.	110	1.02	112	111	1.03	114
	Dec.	87	1.07	93	89	1.07	95
	Total	4,357	.51	2,215	4,294	.52	2,236
	Jan.	103	.95	98	103	.95	98
	Feb.	116	.95	110	116	.95	110
	March	171	.94	160	171	.94	160
	April	289	.74	215	287	.75	215
	May	952	.37	354	935	.38	355
1945	June	1,050	.34	360	1,031	.35	362
	July	675	.37	248	666	.38	252
	Aug.	320	.67	213	314	.69	216
	Sept.	159	.64	102	156	.67	105
	Oct.	150	.85	128	151	.86	130
	Nov.	139	.91	126	140	.91	128
	Dec.	108	.97	105	110	.97	107
	Total	4,232	.52	2,219	4,180	.53	2,238
	Jan.	112	.91	102	112	.91	102
	Feb.	110	.83	91	110	.83	91
	March	222	.83	185	222	.83	185
	April	535	.53	286	533	.54	286
	May	760	.38	292	742	.40	294
1946	June	772	.33	255	751	.34	257
	July	252	.44	110	241	.47	114
	Aug.	143	.74	106	137	.80	110
	Sept.	101	.82	83	99	.87	86
	Oct.	147	.83	122	149	.83	124
	Nov.	160	.90	144	161	.91	146
	Dec.	148	.85	126	150	.85	128
	Total	3,462	.55	1,902	3,407	.56	1,923
	Jan.	94	0.89	84	94	0.89	84
	Feb.	138	.79	[illegible]	138	.79	109
	March	403	.69	[illegible]	403	.69	279
	April	425	.54	[illegible]	422	.54	228
	May	1,439	.36	512	1,416	.36	513
	June	1,351	.36	480	1,323	.36	482
1947	July	644	.38	248	630	.40	252
	Aug.	336	.61	205	328	.63	208
	Sept.	159	.71	113	156	.74	116
	Oct.	171	.82	140	174	.82	142
	Nov.	163	.86	140	165	.86	142
	Dec.	151	.91	137	154	.90	139
	Total	5,474	.49	2,675	5,403	.50	2,69[illegible]
	Jan.	130	.91	118	130	.91	118
	Feb.	139	.76	106	139	.76	106
	March	277	.83	230	277	.83	230
	April	544	.62	335	542	.62	335
	May	1,089	.34	370	1,075	.35	371
1948	June	939	.32	300	925	.33	302
	July	242	.53	128	238	.55	131
	Aug.	123	.65	80	120	.69	83
	Sept.	86	.79	52	64	.86	55
	Oct.	90	.84	76	91	.86	78
	Nov.	96	.94	90	96	.96	92
	Dec.	93	1.04	97	93	1.05	98
	Total	3,828	.52	1,982	3,790	.53	1,999
	Jan.	97	.89	86	97	.89	86
	Feb.	104	.82	85	104	.82	85
	March	263	.78	205	263	.78	205
	April	490	.59	287	487	.59	287
	May	1,229	.38	470	1,204	.39	471
	June	1,548	.37	580	1,514	.38	581
1949	July	558	.48	270	541	.50	273
	Aug.	153	.70	108	148	.75	111
	Sept.	104	.77	80	101	.81	82
	Oct.	193	.85	165	197	.84	166
	Nov.	175	.89	155	178	.88	156
	Dec.	114	1.04	118	117	1.02	119
	Total	5,028	.52	2,609	4,951	.53	2,622
	Jan.	125	1.00	125	125	1.00	125
	Feb.	135	.85	115	135	.85	115
	March	321	.78	250	321	.78	250
	April	649	.50	325	645	.50	325
	May	1,069	.45	480	1,039	.45	480
1950	June	1,597	.33	520	1,558	.34	522
	July	711	.43	308	688	.45	311
	Aug.	226	.62	140	217	.66	143
	Sept.	145	.79	114	142	.82	117
	Oct.	144	.87	126	149	.85	127
	Nov.	165	.83	137	168	.82	138
	Dec.	159	.86	137	163	.85	138
	Total	5,446	.51	2,777	5,350	.52	2,791
	Jan.	108	.91	98	108	.91	98
	Feb.	164	.79	130	164	.79	130
	March	214	.79	170	214	.79	170
	April	394	.57	225	390	.58	225
	May	938	.41	385	914	.42	385
1951	June	1,299	.37	481	1,270	.38	483
	July	616	.40	250	603	.42	253
	Aug.	358	.61	220	352	.63	223
	Sept.	160	.65	104	159	.67	107
	Oct.	207	.82	170	209	.82	171
	Nov.	158	.87	137	160	.86	138
	Dec.	131	.92	120	133	.91	121
	Total	4,747	.52	2,490	4,676	.54	2,504
	Jan.	125	.90	112	125	.90	112
	Feb.	132	.86	114	132	.86	114
	March	151	.85	129	151	.85	129
	April	959	.68	652	954	.68	652
	May	1,888	.42	793	1,862	.43	793
	June	1,738	.34	590	1,707	.35	592
1952	July	477	.57	270	465	.59	273
	Aug.	294	.70	206	288	.73	209
	Sept.	166	.80	133	164	.83	136
	Oct.	117	.98	115	116	1.00	116
	Nov.	115	1.04	120	114	1.06	121
	Dec.	120	1.08	130	121	1.08	131
	Total	6,282	.54	[illegible],364	6,139	.54	3,37[illegible]

Table 4

Colorado River Basin

Flow and Quality of Water Data

Green River near Ouray, Utah

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	139	0.86	120	139	0.86	120
	Feb.	137	.88	120	137	.88	120
	March	215	.86	185	215	.86	185
	April	234	.79	185	231	.80	185
	May	501	.45	225	485	.47	226
	June	1,185	.33	390	1,164	.34	391
1953	July	354	.42	150	344	.44	153
	Aug.	200	.68	137	196	.71	140
	Sept.	83	.78	65	82	.82	67
	Oct.	82	.95	78	83	.95	79
	Nov.	118	.97	115	119	.98	116
	Dec.	105	1.00	105	107	.99	106
	Total	3,353	.56	1,875	3,302	.57	1,888
	Jan.	105	.95	100	105	.95	100
	Feb.	139	.86	120	139	.86	120
	March	172	.84	145	172	.84	145
	April	291	.60	175	291	.60	175
	May	693	.32	220	687	.32	221
	June	373	.39	145	361	.41	147
1954	July	348	.37	130	339	.39	133
	Aug.	122	.49	60	118	.53	63
	Sept.	117	.77	90	116	.79	92
	Oct.	127	.94	120	131	.92	121
	Nov.	116	.90	105	119	.89	106
	Dec.	76	1.12	85	78	1.10	86
	Total	2,679	.56	1,495	2.656	.57	1,509
	Jan.	78	.90	70	78	.90	70
	Feb.	83	.84	70	83	.84	70
	March	203	.91	185	203	.91	185
	April	319	.64	205	319	.64	205
	May	707	.34	240	701	.34	241
1955	June	676	.32	215	663	.33	216
	July	214	.40	85	208	.42	88
	Aug.	151	.73	110	148	.76	113
	Sept.	68	.81	55	66	.85	56
	Oct.	75	.89	67	70	.97	68
	Nov.	84	.96	81	87	.94	82
	Dec.	126	.87	110	128	.87	111
	Total	2,784	.54	1,493	2,754	.55	1,505
	Jan.	140	0.86	120	140	0.86	120
	Feb.	93	.97	90	93	.97	90
	March	330	.67	220	330	.67	220
	April	489	.45	220	489	.45	220
	May	1,040	.31	325	1,023	.32	326
	June	1,180	.30	355	1,147	.31	357
1956	July	288	.42	120	281	.44	123
	Aug.	166	.60	100	162	.64	103
	Sept.	70	.61	43	69	.64	44
	Oct.	75	.80	60	82	.74	61
	Nov.	96	.92	88	102	.87	89
	Dec.	80	.95	76	85	.90	77
	Total	4,047	.45	1,817	4,003	.46	1,830
	Jan.	83	.88	73	83	.88	73
	Feb.	102	.90	92	102	.90	92
	March	230	.83	191	230	.83	191
	April	317	.66	209	317	.66	209
	May	987	.42	414	983	.42	414
	June	1,915	.31	590	1,909	.31	591
1957	July	1,185	.30	360	1,179	.31	362
	Aug.	345	.61	210	342	.62	212
	Sept.	179	.70	125	178	.71	126
	Oct.	181	.79	143	183	.79	144
	Nov.	206	.83	171	208	.83	172
	Dec.	140	.84	118	141	1.01	142
	Total	5,870	.46	2,696	5,855	.47	2,728
	Jan.	122	.79	96	122	.79	96
	Feb.	178	.73	130	178	.73	130
	March	246	.79	194	246	.79	194
	April	422	.58	245	422	.58	245
	May	1,357	.33	450	1,355	.33	450
1958	June	1,115	.28	312	1,113	.28	313
	July	189	.53	100	187	.55	102
	Aug.	99	.65	64	98	.67	66
	Sept.	83	.82	68	82	.84	69
	Oct.	85	.84	71	86	.83	71
	Nov.	99	.91	90	100	.90	90
	Dec.	110	.87	96	110	.87	96
	Total	4,105	.47	1,916	4,099	.47	1,922

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	100	0.90	90	Same as historical		
	Feb.	117	.77	90			
	March	160	.82	131			
	April	235	.60	141			
	May	508	.36	183			
	June	813	.31	252			
1959	July	316	.46	145			
	Aug.	169	.69	117			
	Sept.	101	.79	80			
	Oct.	170	.71	121			
	Nov.	145	.72	104			
	Dec.	103	.88	91			
	Total	2,937	.53	1,545			
	Jan.	87	.86	75			
	Feb.	86	.93	80			
	March	345	.73	252			
	April	576	.42	242			
	May	575	.36	207			
	June	729	.30	219			
1960	July	165	.50	82			
	Aug.	71	.68	48			
	Sept.	62	.73	45			
	Oct.	94	.80	75			
	Nov.	109	.75	82			
	Dec.	76	.88	67			
	Total	2,975	.50	1,474			
	Jan.	76	.78	59			
	Feb.	93	.74	69			
	March	151	.78	118			
	April	184	.67	123			
	May	387	.37	143			
	June	575	.29	167			
1961	July	112	.46	52			
	Aug.	73	.77	56			
	Sept.	158	.81	128			
	Oct.	216	.67	145			
	Nov.	160	.72	115			
	Dec.	113	.85	95			
	Total	2,298	.55	1,270			

ANNUAL SUMMARY

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	4,447	0.60	2,671	4,385	0.61	2,694
1942	4,535	.56	2,544	4,485	.57	2,565
1943	4,257	.52	2,232	4,198	.54	2,251
1944	4,357	.51	2,215	4,294	.52	2,236
1945	4,232	.52	2,219	4,180	.53	2,238
1946	3,462	.55	1,902	3,407	.56	1,923
1947	5,474	.49	2,675	5,403	.50	2,694
1948	3,828	.52	1,982	3,790	.53	1,999
1949	5,028	.52	2,609	4,951	.53	2,622
1950	5,446	.51	2,777	5,350	.52	2,791
1951	4,747	.52	2,490	4,676	.54	2,504
1952	6,282	.54	3,364	6,199	.54	3,378
1953	3,353	.56	1,875	3,302	.57	1,888
1954	2,679	.56	1,495	2,656	.57	1,509
1955	2,784	.54	1,493	2,754	.55	1,505
1956	4,047	.45	1,817	4,003	.46	1,830
1957	5,870	.46	2,696	5,855	.47	2,728
1958	4,105	.47	1,916	4,099	.47	1,922
1959	2,937	.53	1,545	2,937	.53	1,545
1960	2,975	.50	1,474	2,975	.50	1,474
1961	2,298	.55	1,270	2,298	.55	1,270
Total	87,143		45,261	86,197		45,566
Average	4,150	0.52	2,155	4,105	0.53	2,170

Sampled quality record December 1950 to September 1952, November 1956 to December 1959, March 1960 to December 1961; remainder by correlation.

Measured flow record October 1947 to September 1955, October 1956 to December 31, 1961; remainder by correlation.

Table 5

Colorado River Basin

Flow and Quality of Water Data

Green River at Green River, Utah

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	Jan.	100	1.01	101	102	1.01	103
	Feb.	126	1.06	134	127	1.06	135
	March	216	1.01	218	216	1.01	218
	April	314	.75	235	311	.76	235
	May	1,172	.53	621	1,140	.55	625
	June	1,146	.49	562	1,112	.51	569
	July	359	.63	226	339	.70	236
	Aug.	267	1.09	292	254	1.19	303
	Sept.	182	1.01	184	176	1.10	194
	Oct.	318	1.00	318	324	1.00	325
	Nov.	240	.90	216	245	.90	221
	Dec.	168	.98	165	171	.99	169
	Total	4,608	.71	3,272	4,517	.74	3,333
1942	Jan.	112	1.04	117	113	1.04	118
	Feb.	122	.98	120	123	.98	121
	March	264	.94	248	264	.94	248
	April	858	.65	557	856	.65	557
	May	980	.57	558	955	.59	562
	June	1,271	.39	495	1,243	.40	501
	July	414	.57	236	396	.62	246
	Aug.	152	.85	129	141	.99	139
	Sept.	91	1.10	100	84	1.29	108
	Oct.	118	1.20	142	123	1.20	148
	Nov.	124	1.18	146	128	1.18	151
	Dec.	116	1.22	141	120	1.21	145
	Total	4,622	.65	2,989	4,546	.67	3,044
1943	Jan.	112	1.13	127	113	1.13	128
	Feb.	130	1.02	132	131	1.02	133
	March	236	.91	215	236	.91	215
	April	569	.57	325	566	.57	325
	May	763	.39	298	738	.41	300
	June	1,074	.40	430	1,044	.42	435
	July	612	.43	263	595	.46	271
	Aug.	300	.83	249	289	.89	257
	Sept.	116	.98	114	110	1.10	121
	Oct.	124	1.10	136	128	1.10	141
	Nov.	146	1.04	152	149	1.05	156
	Dec.	112	1.11	124	116	1.10	128
	Total	4,294	.60	2,565	4,215	.62	2,610
1944	Jan.	80	1.20	96	82	1.20	98
	Feb.	111	1.06	118	112	1.01	119
	March	252	1.07	270	252	1.08	270
	April	529	.81	428	526	.81	428
	May	924	.48	444	894	.50	448
	June	1,391	.30	417	1,356	.31	423
	July	591	.44	260	570	.47	270
	Aug.	143	.73	104	129	.89	115
	Sept.	73	.96	70	64	1.23	79
	Oct.	115	1.13	130	121	1.13	137
	Nov.	119	1.14	136	124	1.14	141
	Dec.	88	1.23	108	92	1.22	112
	Total	4,416	.58	2,581	4,324	.61	2,540
1945	Jan.	109	1.04	113	110	1.04	114
	Feb.	128	.99	127	129	.99	128
	March	185	1.03	191	185	1.03	191
	April	291	.84	244	289	.85	244
	May	909	.44	400	884	.45	402
	June	1,016	.39	396	989	.41	401
	July	701	.41	287	685	.43	296
	Aug.	335	.74	248	324	.79	256
	Sept.	163	.77	125	157	.84	132
	Oct.	161	.99	159	165	1.00	165
	Nov.	149	.99	148	153	.99	152
	Dec.	113	1.06	120	117	1.06	124
	Total	4,260	.60	2,558	4,187	.62	2,505
1946	Jan.	123	.95	117	124	.95	118
	Feb.	117	.91	106	118	.91	107
	March	236	.90	212	236	.90	212
	April	528	.60	317	526	.60	317
	May	775	.41	318	750	.43	321
	June	746	.36	269	716	.38	275
	July	264	.47	124	245	.54	133
	Aug.	152	.84	128	141	.97	137
	Sept.	105	.91	96	100	1.04	104
	Oct.	149	1.00	149	154	1.01	155
	Nov.	170	.98	167	174	.98	171
	Dec.	154	.94	145	158	.94	149
	Total	3,519	.61	2,148	3,442	.64	2,199
1947	Jan.	92	1.07	98	93	1.06	99
	Feb.	151	.86	130	152	.86	131
	March	411	.79	325	411	.79	325
	April	422	.59	249	419	.59	249
	May	1,400	.38	532	1,370	.39	534
	June	1,348	.39	526	1,313	.40	531
	July	656	.40	262	635	.43	270
	Aug.	365	.71	259	352	.76	267
	Sept.	166	.77	128	161	.84	135
	Oct.	181	.91	165	187	.91	170
	Nov.	179	.91	163	183	.91	167
	Dec.	152	1.01	154	157	1.01	158
	Total	5,523	.54	2,991	5,433	.56	3,036
1948	Jan.	141	.94	132	142	.94	133
	Feb.	137	.91	124	138	.90	124
	March	313	.86	270	313	.86	270
	April	558	.69	385	556	.69	385
	May	1,061	.39	414	1,043	.40	416
	June	952	.34	324	933	.35	328
	July	268	.54	145	260	.58	151
	Aug.	137	.81	111	130	.90	117
	Sept.	69	.81	56	65	.95	62
	Oct.	92	1.02	94	95	1.03	98
	Nov.	104	1.05	109	105	1.08	113
	Dec.	97	1.10	107	98	1.11	109
	Total	3,929	.58	2,271	3,878	.59	2,306
1949	Jan.	100	1.01	101	100	1.01	101
	Feb.	110	.92	101	110	.92	101
	March	276	.92	254	276	.92	254
	April	474	.69	327	471	.69	327
	May	1,221	.43	525	1,193	.44	526
	June	1,547	.42	650	1,510	.43	652
	July	592	.57	338	572	.60	343
	Aug.	172	.77	132	166	.83	137
	Sept.	112	.89	100	108	.96	104
	Oct.	207	.98	203	212	.97	205
	Nov.	190	.90	171	194	.89	173
	Dec.	128	1.07	137	132	1.05	139
	Total	5,129	.59	3,039	5,044	.61	3,062
1950	Jan.	141	1.01	142	142	1.01	143
	Feb.	147	1.01	148	147	1.01	148
	March	356	.90	321	356	.90	321
	April	620	.64	397	616	.64	397
	May	1,026	.53	544	993	.55	545
	June	1,567	.35	548	1,525	.36	552
	July	734	.49	360	707	.52	365
	Aug.	246	.63	155	234	.68	160
	Sept.	149	.89	133	144	.96	138
	Oct.	153	.96	147	160	.94	150
	Nov.	166	.99	164	170	.98	166
	Dec.	171	.96	164	176	.94	166
	Total	5,476	.59	3,223	5,370	.61	3,251
1951	Jan.	113	1.13	128	114	1.13	129
	Feb.	167	.92	154	167	.92	154
	March	205	.93	190	205	.93	190
	April	372	.70	260	368	.71	260
	May	882	.45	397	855	.47	398
	June	1,309	.40	524	1,277	.41	528
	July	627	.43	270	610	.45	275
	Aug.	379	.69	261	370	.72	266
	Sept.	178	.79	140	175	.83	145
	Oct.	211	.99	210	215	.99	213
	Nov.	164	1.05	172	167	1.04	174
	Dec.	132	1.07	142	135	1.07	144
	Total	4,739	.60	2,848	4,658	.62	2,876
1952	Jan.	134	1.01	136	134	1.02	136
	Feb.	140	.96	135	140	.96	135
	March	160	1.05	168	160	1.05	168
	April	988	.88	869	983	.88	869
	May	2,087	.48	1,002	2,058	.49	1,002
	June	1,809	.36	651	1,775	.37	654
	July	514	.60	309	499	.63	314
	Aug.	315	.89	280	308	.93	285
	Sept.	184	.96	177	181	1.01	182
	Oct.	129	1.09	140	129	1.10	142
	Nov.	122	1.24	151	122	1.25	153
	Dec.	129	1.20	155	131	1.20	157
	Total	6,711	.62	4,173	6,620	.63	4,197

Table 5

Colorado River Basin

Flow and Quality of Water Data

Green River at Green River, Utah

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	140	1.05	147	140	1.05	147
	Feb.	141	1.04	147	141	1.04	147
	March	217	1.00	217	217	1.00	217
	April	221	.96	212	218	.97	212
	May	454	.55	250	435	.58	251
	June	1,167	.37	432	1,143	.38	434
-1953	July	376	.48	181	363	.51	186
	Aug.	212	.84	178	207	.88	183
	Sept.	87	.99	86	85	.95	90
	Oct.	86	1.20	104	88	1.20	106
	Nov.	125	1.15	144	127	1.15	146
	Dec.	107	1.18	126	110	1.16	128
	Total	3,333	.67	2,224	3,274	.69	2,247
	Jan.	107	1.09	117	107	1.09	117
	Feb.	138	1.03	142	138	1.03	142
	March	169	1.03	174	169	1.03	174
	April	270	.75	202	270	.75	202
	May	640	.38	243	631	.39	244
	June	376	.45	169	361	.48	172
-1954	July	346	.46	159	334	.49	164
	Aug.	120	.65	78	115	.72	83
	Sept.	134	1.02	137	132	1.07	141
	Oct.	139	1.14	159	144	1.12	161
	Nov.	120	1.06	127	124	1.04	129
	Dec.	80	1.25	100	83	1.23	102
	Total	2,639	.68	1,807	2,608	.70	1,831
	Jan.	80	1.06	85	80	1.06	85
	Feb.	86	.92	79	86	.92	79
	March	237	.92	218	237	.92	218
	April	311	.77	239	311	.77	239
	May	677	.39	264	669	.40	265
	June	654	.36	236	639	.37	238
-1955	July	223	.46	102	215	.49	106
	Aug.	161	.83	134	157	.88	138
	Sept.	71	.93	66	69	.99	68
	Oct.	77	1.08	83	81	1.05	85
	Nov.	86	1.13	97	90	1.10	99
	Dec.	127	1.02	130	129	1.02	131
	Total	2,790	.62	1,733	2,763	.63	1,751
	Jan.	155	.91	141	155	.91	141
	Feb.	100	1.05	105	100	1.05	105
	March	314	.81	255	314	.81	255
	April	460	.53	244	460	.53	244
	May	995	.35	348	976	.36	349
	June	1,207	.32	386	1,173	.33	388
-1956	July	294	.49	144	286	.52	148
	Aug.	169	.67	113	166	.70	117
	Sept.	72	.72	52	71	.75	53
	Oct.	77	.94	73	84	.88	74
	Nov.	99	1.02	101	105	.97	102
	Dec.	79	1.05	83	84	1.00	84
	Total	4,021	.51	2,045	3,976	.52	2,060
	Jan.	83	.95	79	84	.95	80
	Feb.	100	.94	94	100	.94	94
	March	237	.89	210	237	.89	210
	April	290	.73	212	290	.73	212
	May	913	.48	438	906	.48	439
	June	1,871	.34	636	1,862	.34	639
-1957	July	1,164	.34	396	1,154	.35	400
	Aug.	386	.79	305	380	.81	309
	Sept.	202	.76	153	199	.78	156
	Oct.	185	.94	174	189	.94	177
	Nov.	228	.96	219	231	.96	221
	Dec.	149	.97	144	151	.97	146
	Total	5,808	.53	3,060	5,783	.53	3,083
	Jan.	128	.93	119	128	.93	119
	Feb.	183	.86	158	183	.96	158
	March	246	.92	227	246	.92	227
	April	432	.71	307	432	.71	307
	May	1,311	.41	537	1,306	.41	537
	June	1,174	.35	411	1,159	.35	413
-1958	July	224	.62	139	220	.55	143
	Aug.	110	.82	91	107	.94	95
	Sept.	96	1.07	103	95	1.12	106
	Oct.	91	1.01	92	93	1.00	93
	Nov.	102	1.10	113	104	1.10	114
	Dec.	114	1.09	124	115	1.09	125
	Total	4,211	.57	2,421	4,198	.58	2437

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	97	1.13	110	Same as historical		
	Feb.	114	.95	108			
	March	146	.94	137			
	April	219	.76	166			
	May	480	.42	202			
	June	763	.34	259			
-1959	July	346	.51	176			
	Aug.	180	.90	162			
	Sept.	104	.92	96			
	Oct.	178	.86	153			
	Nov.	152	.83	126			
	Dec.	106	1.02	108			
	Total	2,885	.62	1,803			
	Jan.	95	1.05	100			
	Feb.	102	.95	97			
	March	320	.83	266			
	April	534	.51	272			
	May	551	.39	215			
	June	682	.33	225			
-1960	July	170	.52	88			
	Aug.	69	.76	52			
	Sept.	59	.93	55			
	Oct.	96	1.00	96			
	Nov.	105	.90	94			
	Dec.	80	1.06	85			
	Total	2,863	.57	1,645			
	Jan.	79	.98	77			
	Feb.	94	.87	82			
	March	136	.89	121			
	April	184	.79	145			
	May	342	.41	140			
	June	542	.31	168			
-1961	July	112	.49	55			
	Aug.	80	.91	73			
	Sept.	175	.99	173			
	Oct.	234	.75	176			
	Nov.	161	.80	129			
	Dec.	126	.88	111			
	Total	2,265	.64	1,450			

ANNUAL SUMMARY

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	4,608	0.71	3,272	4,517	0.74	3,333
1942	4,622	.65	2,989	4,546	.67	3,044
1943	4,294	.60	2,565	4,215	.62	2,610
1944	4,416	.58	2,581	4,324	.61	2,640
1945	4,260	.60	2,558	4,187	.62	2,605
1946	3,519	.61	2,148	3,442	.64	2,199
1947	5,523	.54	2,991	5,433	.56	3,036
1948	3,929	.58	2,271	3,878	.59	2,306
1949	5,129	.59	3,039	5,044	.61	3,062
1950	5,476	.59	3,223	5,370	.61	3,251
1951	4,739	.60	2,848	4,658	.62	2,876
1952	6,711	.62	4,173	6,620	.63	4,197
1953	3,333	.67	2,224	3,274	.69	2,247
1954	2,639	.68	1,807	2,608	.70	1,831
1955	2,790	.62	1,733	2,763	.63	1,751
1956	4,021	.51	2,045	3,976	.52	2,060
1957	5,808	.53	3,060	5,783	.53	3,083
1958	4,211	.57	2,421	4,198	.58	2,437
1959	2,885	.62	1,803	2,885	.62	1,803
1960	2,863	.57	1,645	2,863	.57	1,645
1961	2,265	.64	1,450	2,265	.64	1,450
Total	88,041		52,846	86,849		53,466
Average	4,192	0.60	2,516	4,136	0.62	2,546

Sampled quality record entire period.

Measured flow record entire period.

Table 6
Colorado River Basin
Flow and Quality of Water Data
San Rafael River near Green River, Utah

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	Jan.	2	4.0	8	Same as Historical		
	Feb.	2	4.0	8			
	March	6	3.5	21			
	April	1	4.0	4			
	May	50	1.2	62			
	June	49	1.2	59			
	July	7	2.9	20			
	Aug.	6	3.3	20			
	Sept.	2	4.5	9			
	Oct.	5	4.0	20			
	Nov.	5	4.2	21			
	Dec.	4	4.0	16			
	Total	139	1.9	268			
1942	Jan.	6	2.8	17			
	Feb.	5	3.6	18			
	March	6	3.7	22			
	April	14	2.8	39			
	May	34	1.4	49			
	June	51	1.2	61			
	July	6	3.0	18			
	Aug.	6	3.2	19			
	Sept.	1	5.0	5			
	Oct.	2	5.0	10			
	Nov.	3	4.7	14			
	Dec.	3	4.7	14			
	Total	137	2.1	286			
1943	Jan.	4	3.0	12			
	Feb.	5	3.4	17			
	March	6	3.8	23			
	April	15	2.9	44			
	May	13	2.1	27			
	June	14	2.0	28			
	July	2	3.5	7			
	Aug.	6	3.2	19			
	Sept.	1	5.0	5			
	Oct.	2	5.0	10			
	Nov.	2	5.0	10			
	Dec.	3	3.7	11			
	Total	73	2.9	213			
1944	Jan.	2	3.5	7			
	Feb.	3	3.0	9			
	March	6	3.5	21			
	April	1	5.0	5			
	May	40	1.3	53			
	June	72	1.1	78			
	July	9	2.9	26			
	Aug.	7	3.1	22			
	Sept.	1	5.0	5			
	Oct.	2	5.0	10			
	Nov.	3	4.7	14			
	Dec.	3	4.3	13			
	Total	149	1.8	263			
1945	Jan.	3	3.3	10			
	Feb.	3	4.0	12			
	March	6	3.5	21			
	April	1	6.0	6			
	May	22	1.6	35			
	June	27	1.5	41			
	July	6	3.2	19			
	Aug.	7	3.4	24			
	Sept.	2	4.0	8			
	Oct.	3	5.0	15			
	Nov.	3	4.7	14			
	Dec.	2	4.5	9			
	Total	85	2.5	214			
1946	Jan.	2	4.0	8			
	Feb.	4	3.3	13			
	March	6	3.7	22			
	April	11	3.2	35			
	May	20	1.8	36			
	June	8	2.4	19			
	July	1	4.0	4			
	Aug.	7	5.4	38			
	Sept.	0	0	0			
	Oct.	2	5.0	10			
	Nov.	5	3.8	19			
	Dec.	3	4.3	13			
	Total	69	3.2	218			
1947	Jan.	2	4.5	9	Same as Historical		
	Feb.	5	3.0	15			
	March	4	3.8	15			
	April	3	4.3	13			
	May	33	1.4	46			
	June	26	1.8	47			
	July	5	3.6	18			
	Aug.	20	3.4	68			
	Sept.	3	5.0	15			
	Oct.	2	6.0	12			
	Nov.	4	3.8	15			
	Dec.	4	3.5	14			
	Total	111	2.6	287			
1948	Jan.	3	3.7	11			
	Feb.	6	3.0	18			
	March	7	3.6	25			
	April	4	3.5	14			
	May	16	1.4	23			
	June	13	2.2	29			
	July	2	4.0	8			
	Aug.	6	2.2	13			
	Sept.	0	0	0			
	Oct.	1	5.0	5			
	Nov.	2	5.0	10			
	Dec.	2	4.5	9			
	Total	62	2.7	165			
1949	Jan.	2	4.0	8			
	Feb.	2	4.0	8			
	March	9	3.3	30			
	April	10	2.2	22			
	May	30	1.3	38			
	June	52	1.2	64			
	July	14	2.7	38			
	Aug.	5	3.0	15			
	Sept.	3	4.7	14			
	Oct.	3	4.7	14			
	Nov.	3	4.7	14			
	Dec.	2	4.5	9			
	Total	135	2.0	274			
1950	Jan.	2	4.5	9			
	Feb.	6	3.3	20			
	March	5	4.0	20			
	April	3	4.7	14			
	May	9	2.2	20			
	June	11	2.2	24			
	July	9	2.9	26			
	Aug.	1	3.0	3			
	Sept.	1	5.0	5			
	Oct.	1	6.0	6			
	Nov.	2	5.5	11			
	Dec.	3	4.3	13			
	Total	53	3.2	171			
1951	Jan.	2	5.0	10			
	Feb.	3	3.7	11			
	March	2	5.0	10			
	April	1	6.0	6			
	May	15	1.9	29			
	June	23	1.7	40			
	July	3	3.7	11			
	Aug.	12	2.2	27			
	Sept.	1	5.0	5			
	Oct.	6	4.0	24			
	Nov.	4	4.5	18			
	Dec.	3	5.0	15			
	Total	75	2.8	207			
1952	Jan.	3	3.7	11			
	Feb.	5	3.6	18			
	March	14	3.1	44			
	April	24	2.4	58			
	May	93	.8	78			
	June	128	.9	114			
	July	19	1.9	36			
	Aug.	12	3.3	40			
	Sept.	5	3.8	19			
	Oct.	3	4.7	14			
	Nov.	4	4.5	18			
	Dec.	4	4.0	16			
	Total	314	1.5	467			

Table 6

Colorado River Basin

Flow and Quality of Water Data

San Rafael River near Green River, Utah

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1953	Jan.	6	2.8	17	Same as Historical		
	Feb.	7	3.1	22			
	March	6	3.2	19			
	April	3	4.3	13			
	May	2	5.5	11			
	June	31	1.3	47			
	July	5	3.8	19			
	Aug.	9	3.7	33			
	Sept.	1	5.0	5			
	Oct.	4	4.3	17			
	Nov.	4	4.5	18			
	Dec.	3	4.8	14			
	Total	81	2.9	235			
1954	Jan.	3	4.0	12			
	Feb.	5	3.8	19			
	March	4	3.8	15			
	April	3	4.3	13			
	May	8	2.9	23			
	June	1	5.0	5			
	July	1	5.0	5			
	Aug.	1	3.0	3			
	Sept.	4	4.0	16			
	Oct.	2	4.0	8			
	Nov.	2	4.5	9			
	Dec.	2	4.5	9			
	Total	36	3.8	137			
1955	Jan.	2	4.0	8			
	Feb.	2	3.5	7			
	March	6	3.5	21			
	April	3	3.7	11			
	May	4	3.0	12			
	June	6	2.8	17			
	July	0	0	0			
	Aug.	3	3.7	11			
	Sept.	0	0	0			
	Oct.	0	0	0			
	Nov.	1	5.0	5			
	Dec.	2	4.5	9			
	Total	29	3.5	101			
1956	Jan.	3	3.7	11			
	Feb.	3	3.3	10			
	March	3	3.3	10			
	April	1	5.0	5			
	May	11	1.6	18			
	June	8	2.0	16			
	July	1	4.0	4			
	Aug.	1	3.0	3			
	Sept.	0	0	0			
	Oct.	0	0	0			
	Nov.	1	5.0	5			
	Dec.	1	5.0	5			
	Total	33	2.6	87			
1957	Jan.	2	3.0	6			
	Feb.	4	3.0	12			
	March	2	5.0	10			
	April	1	5.0	5			
	May	9	3.1	28			
	June	94	.8	79			
	July	24	1.5	37			
	Aug.	13	2.8	36			
	Sept.	4	3.5	14			
	Oct.	10	3.3	33			
	Nov.	21	2.5	53			
	Dec.	5	3.4	17			
	Total	189	1.7	330			
1958	Jan.	5	2.6	13			
	Feb.	8	2.8	22			
	March	6	3.3	20			
	April	13	1.6	21			
	May	66	.9	60			
	June	57	.8	47			
	July	2	4.0	8			
	Aug.	4	4.5	18			
	Sept.	4	4.3	17			
	Oct.	1	5.0	5			
	Nov.	2	4.0	8			
	Dec.	4	3.3	13			
	Total	172	1.5	252			

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1959	Jan.	3	3.3	10	Same as historical		
	Feb.	4	3.0	12			
	March	3	4.0	12			
	April	2	3.5	7			
	May	1	5.0	5			
	June	2	4.0	8			
	July	0	0	1			
	Aug.	1	3.0	3			
	Sept.	1	5.0	5			
	Oct.	1	4.0	4			
	Nov.	2	4.0	8			
	Dec.	1	7.0	7			
	Total	21	3.9	82			
1960	Jan.	1	6.0	6			
	Feb.	2	3.5	7			
	March	8	2.8	22			
	April	3	3.3	10			
	May	8	1.9	15			
	June	11	1.5	17			
	July	0	0	1			
	Aug.	0	0	0			
	Sept.	1	4.0	4			
	Oct.	8	2.5	20			
	Nov.	2	4.5	9			
	Dec.	2	4.0	8			
	Total	46	2.6	119			
1961	Jan.	2	3.5	7			
	Feb.	3	2.7	8			
	March	2	5.5	11			
	April	2	4.0	8			
	May	3	3.0	9			
	June	2	2.5	5			
	July	0	0	0			
	Aug.	7	2.9	20			
	Sept.	18	2.9	53			
	Oct.	3	4.0	12			
	Nov.	4	3.5	14			
	Dec.	2	4.5	9			
	Total	48	3.3	156			

ANNUAL SUMMARY

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	139	1.9	268	Same as historical		
1942	137	2.1	286			
1943	73	2.9	213			
1944	149	1.8	263			
1945	85	2.5	214			
1946	69	3.2	218			
1947	111	2.6	287			
1948	62	2.7	165			
1949	135	2.0	274			
1950	53	3.2	171			
1951	75	2.8	207			
1952	314	1.5	467			
1953	81	2.9	235			
1954	36	3.8	137			
1955	29	3.5	101			
1956	33	2.6	87			
1957	189	1.7	330			
1958	172	1.5	252			
1959	21	3.9	82			
1960	46	2.6	119			
1961	48	3.3	156			
Total	2,057		4,532			
Average	98	2.2	216			

Sampled quality record November 1946 to September 1949, November 1950 to December 1961; remainder by correlation.

Measured flow record October 1945 to December 1961; remainder by correlation.

Table 7
Colorado River Basin
Flow and Quality of Water Data
Colorado River near Cameo, Colorado

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	Jan.	65	1.23	80	51	1.55	79
	Feb.	67	1.15	77	53	1.43	76
	March	82	1.11	91	64	1.41	90
	April	133	.83	111	119	.92	110
	May	948	.34	322	909	.35	320
	June	803	.28	225	710	.31	220
	July	315	.47	148	247	.59	145
	Aug.	144	.91	131	108	1.19	129
	Sept.	122	.97	118	104	1.12	117
	Oct.	166	.88	146	152	.95	145
	Nov.	124	.96	119	110	1.07	118
	Dec.	104	1.11	115	90	1.27	114
	Total	3,073	.55	1,683	2,717	.61	1,663
1942	Jan.	90	1.24	112	72	1.54	111
	Feb.	86	1.19	102	68	1.48	101
	March	103	1.13	116	80	1.43	115
	April	334	.62	207	316	.65	206
	May	757	.41	311	707	.44	309
	June	1,215	.24	292	1,096	.26	286
	July	407	.44	179	321	.54	175
	Aug.	139	.85	118	94	1.23	116
	Sept.	86	1.15	99	63	1.55	98
	Oct.	94	1.18	111	76	1.44	110
	Nov.	94	1.24	117	76	1.52	116
	Dec.	84	1.26	106	66	1.59	105
	Total	3,489	.54	1,870	3,035	.61	1,848
1943	Jan.	77	1.30	100	63	1.57	99
	Feb.	74	1.26	93	60	1.53	92
	March	89	1.22	109	72	1.50	108
	April	237	.56	133	223	.59	132
	May	509	.32	163	471	.34	161
	June	931	.23	214	839	.25	209
	July	387	.39	151	321	.46	148
	Aug.	192	.73	140	157	.88	138
	Sept.	117	.89	104	100	1.03	103
	Oct.	111	1.00	111	97	1.13	110
	Nov.	115	.90	103	101	1.01	102
	Dec.	107	.93	100	93	1.06	99
	Total	2,946	.52	1,521	2,597	.58	1,501
1944	Jan.	74	1.24	92	61	1.49	91
	Feb.	76	1.11	84	63	1.32	83
	March	81	1.11	90	65	1.37	89
	April	118	.85	100	105	.94	99
	May	564	.36	203	531	.38	201
	June	890	.24	214	809	.26	210
	July	378	.38	143	319	.44	140
	Aug.	123	.80	98	92	1.04	96
	Sept.	78	1.09	85	62	1.35	84
	Oct.	99	1.05	104	86	1.19	103
	Nov.	100	1.01	101	87	1.14	100
	Dec.	99	1.02	101	86	1.16	100
	Total	2,680	.53	1,415	2,366	.59	1,396
1945	Jan.	78	1.15	90	64	1.39	89
	Feb.	72	1.18	85	58	1.45	84
	March	95	.99	94	78	1.19	93
	April	115	.90	104	101	1.02	103
	May	601	.36	216	564	.38	214
	June	795	.27	215	705	.30	211
	July	499	.33	165	434	.37	162
	Aug.	287	.52	149	252	.58	147
	Sept.	118	.83	98	101	.96	97
	Oct.	126	.79	100	112	.88	99
	Nov.	125	.81	101	111	.90	100
	Dec.	117	.89	104	103	1.00	103
	Total	3,028	.50	1,521	2,683	.56	1,502
1946	Jan.	109	.90	98	98	.99	97
	Feb.	91	.97	88	80	1.09	87
	March	99	.94	93	85	1.08	92
	April	285	.45	128	274	.46	127
	May	449	.32	144	419	.34	142
	June	689	.28	193	619	.30	189
	July	267	.51	136	215	.62	133
	Aug.	126	.85	107	99	1.07	106
	Sept.	92	1.01	93	79	1.16	92
	Oct.	122	.89	109	111	.97	108
	Nov.	104	.92	96	93	1.02	95
	Dec.	121	.82	99	110	.89	98
	Total	2,554	.54	1,384	2,282	.60	1,366
1947	Jan.	82	1.04	85	[illegible]	1.33	84
	Feb.	82	.99	81	[illegible]	1.27	80
	March	107	.96	103	[illegible]	1.22	102
	April	178	.63	112	[illegible]	.70	111
	May	809	.28	227	[illegible]	.30	224
	June	1,027	.25	257	901	.28	251
	July	733	.27	198	641	.30	193
	Aug.	240	.58	139	192	.71	137
	Sept.	143	.78	111	119	.92	110
	Oct.	153	.80	122	134	.83	111
	Nov.	135	.77	104	116	.89	103
	Dec.	118	.86	102	99	1.02	101
	Total	3,807	.43	1,641	3,326	.48	1,607
1948	Jan.	116	.84	97	102	.94	96
	Feb.	111	.81	90	97	.92	89
	March	115	.90	104	97	1.06	103
	April	252	.59	149	238	.62	148
	May	920	.30	276	881	.31	274
	June	844	.26	219	752	.28	214
	July	312	.47	146	244	.59	143
	Aug.	161	.77	124	126	.97	122
	Sept.	88	1.03	91	70	1.28	90
	Oct.	109	1.02	111	95	1.16	110
	Nov.	107	.96	103	93	1.10	102
	Dec.	90	1.04	94	76	1.22	93
	Total	3,225	.50	1,604	2,871	.55	1,584
1949	Jan.	99	.96	95	82	1.15	94
	Feb.	84	.92	77	67	1.13	76
	March	98	.98	96	77	1.23	95
	April	201	.65	131	184	.71	130
	May	572	.36	206	525	.39	204
	June	1,080	.26	281	969	.28	275
	July	594	.34	202	513	.39	198
	Aug.	184	.69	127	141	.89	125
	Sept.	122	.93	113	101	1.11	112
	Oct.	125	.98	123	108	1.13	122
	Nov.	108	1.01	109	91	1.19	108
	Dec.	101	1.05	106	84	1.25	105
	Total	3,368	.49	1,666	2,942	.56	1,644
1950	Jan.	91	1.04	95	87	1.09	95
	Feb.	88	.95	84	84	1.00	84
	March	118	.87	103	113	.91	103
	April	212	.59	125	208	.60	125
	May	418	.40	167	406	.41	166
	June	787	.27	212	759	.28	211
	July	273	.54	147	252	.58	146
	Aug.	124	.87	108	113	.95	107
	Sept.	111	.97	108	106	1.02	108
	Oct.	97	1.19	115	93	1.23	115
	Nov.	98	1.14	112	94	1.19	112
	Dec.	98	1.07	105	94	1.11	105
	Total	2,515	.59	1,481	2,409	.61	1,477
1951	Jan.	96	1.01	97	91	1.06	97
	Feb.	88	.95	84	83	1.01	84
	March	99	1.01	100	92	1.08	100
	April	151	.70	106	146	.73	106
	May	536	.34	182	521	.35	181
	June	857	.27	232	820	.28	230
	July	471	.36	170	444	.38	169
	Aug.	207	.68	141	193	.72	140
	Sept.	111	.90	100	104	.96	100
	Oct.	120	.92	110	115	.96	110
	Nov.	104	.97	101	99	1.02	101
	Dec.	106	.96	102	101	1.01	102
	Total	2,946	.52	1,525	2,809	.54	1,520
1952	Jan.	96	1.01	97	87	1.11	97
	Feb.	84	1.06	89	75	1.19	89
	March	113	.99	112	102	1.09	111
	April	313	.60	188	304	.62	188
	May	978	.36	352	954	.37	351
	June	1,320	.26	343	1,263	.27	340
	July	449	.44	197	409	.48	195
	Aug.	276	.70	193	255	.75	192
	Sept.	171	.78	133	160	.82	132
	Oct.	123	.97	119	114	1.04	119
	Nov.	112	1.04	117	103	1.14	117
	Dec.	99	1.12	111	90	1.23	111
	Total	4,134	.50	2,051	3,916	.52	2,042

Table 7

Colorado River Basin

Flow and Quality of Water Data

Colorado River near Cameo, Colorado

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	99	1.03	102	95	1.07	102
	Feb.	80	1.06	85	76	1.12	85
	March	102	.96	98	97	1.01	98
	April	136	.78	106	132	.80	106
	May	346	.44	152	336	.45	151
	June	886	.27	239	862	.28	238
1953	July	294	.52	154	277	.55	153
	Aug.	194	.72	140	185	.76	140
	Sept.	101	.99	100	96	1.04	100
	Oct.	101	1.06	107	98	1.09	107
	Nov.	99	1.13	112	96	1.16	112
	Dec.	92	1.17	108	89	1.21	108
	Total	2,530	.59	1,503	2,439	.62	1,500
	Jan.	95	1.00	95	93	1.02	95
	Feb.	81	1.05	85	79	1.07	85
	March	94	1.01	95	92	1.03	95
	April	136	.78	106	134	.79	106
	May	296	.48	142	292	.49	142
	June	204	.60	123	195	.63	123
1954	July	146	.81	118	140	.84	118
	Aug.	105	.97	102	101	1.01	102
	Sept.	103	1.07	110	101	1.09	110
	Oct.	125	.97	121	123	.98	121
	Nov.	98	1.07	105	96	1.09	105
	Dec.	82	1.23	101	80	1.26	101
	Total	1,565	.83	1,303	1,526	.85	1,303
	Jan.	74	1.23	91	72	1.26	91
	Feb.	67	1.25	84	65	1.29	84
	March	86	1.13	97	84	1.15	97
	April	142	.77	110	140	.78	110
	May	384	.42	161	378	.42	161
	June	448	.37	166	435	.38	165
1955	July	214	.61	130	204	.63	129
	Aug.	157	.87	137	152	.90	137
	Sept.	100	.94	94	98	.96	94
	Oct.	91	1.02	93	89	1.04	93
	Nov.	94	1.06	100	92	1.08	100
	Dec.	89	1.07	95	87	1.09	95
	Total	1,946	.70	1,358	1,896	.72	1,356
	Jan.	81	1.07	87	79	1.10	87
	Feb.	75	1.11	83	73	1.14	83
	March	104	.98	102	102	1.00	102
	April	184	.66	122	182	.67	122
	May	685	.34	233	679	.34	233
	June	637	.31	197	624	.31	196
1956	July	173	.70	121	164	.74	121
	Aug.	115	.95	109	110	.99	109
	Sept.	88	.90	79	86	.92	79
	Oct.	93	.95	88	91	.97	88
	Nov.	84	1.07	90	82	1.10	90
	Dec.	73	1.21	88	71	1.24	88
	Total	2,392	.59	1,399	2,343	.60	1,398
	Jan.	80	1.10	88	78	1.13	88
	Feb.	77	1.10	85	75	1.13	85
	March	83	1.16	96	81	1.18	96
	April	151	.83	125	149	.84	125
	May	591	.47	278	587	.47	278
	June	1,415	.27	382	1,406	.27	382
1957	July	1,072	.27	289	1,065	.27	289
	Aug.	338	.50	169	334	.50	169
	Sept.	157	.78	123	155	.79	123
	Oct.	136	.89	121	134	.90	121
	Nov.	123	.91	112	121	.92	112
	Dec.	102	.96	98	100	.98	98
	Total	4,325	.45	1,966	4,285	.46	1,966
	Jan.	92	.93	86	91	.94	86
	Feb.	95	.93	88	94	.94	88
	March	123	.89	110	121	.91	110
	April	172	.76	130	171	.76	130
	May	847	.31	263	844	.31	263
	June	808	.27	218	800	.27	218
1958	July	193	.67	129	187	.69	129
	Aug.	109	.97	106	106	1.00	106
	Sept.	103	1.03	106	101	1.05	106
	Oct.	100	1.09	109	99	1.10	109
	Nov.	94	1.09	102	93	1.09	102
	Dec.	86	1.12	96	85	1.13	96
	Total	2,822	.55	1,543	2,792	.55	1,543

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	94	1.02	[illegible]		Same as historical	
	Feb.	86	1.01	[illegible]			
	March	82	1.09	[illegible]			
	April	118	.83	[illegible]			
	May	392	.40	157			
	June	684	.29	198			
1959	July	215	.59	127			
	Aug.	131	.87	114			
	Sept.	105	.98	103			
	Oct.	138	.81	112			
	Nov.	116	.87	101			
	Dec.	100	.98	98			
	Total	2,261	.61	1,380			
	Jan.	100	.89	89			
	Feb.	92	.95	87			
	March	135	.78	105			
	April	246	.51	125			
	May	432	.37	160			
	June	668	.30	200			
1960	July	217	.60	130			
	Aug.	117	.89	104			
	Sept.	102	.95	97			
	Oct.	106	1.00	106			
	Nov.	99	1.05	104			
	Dec.	100	1.01	101			
	Total	2,414	.58	1,408			
	Jan.	99	.97	96			
	Feb.	85	.94	80			
	March	86	1.06	91			
	April	103	.91	94			
	May	355	.40	142			
	June	426	.34	145			
1961	July	138	.81	112			
	Aug.	115	.89	102			
	Sept.	175	.73	128			
	Oct.	200	.59	118			
	Nov.	131	.73	96			
	Dec.	121	.78	94			
	Total	2,034	.64	1,298			

ANNUAL SUMMARY

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	3,073	0.55	1,683	2,717	0.61	1,663
1942	3,489	.54	1,870	3,035	.61	1,848
1943	2,946	.52	1,521	2,597	.58	1,501
1944	2,680	.53	1,415	2,366	.59	1,396
1945	3,028	.50	1,521	2,683	.56	1,502
1946	2,554	.54	1,384	2,282	.60	1,366
1947	3,807	.43	1,641	3,326	.48	1,607
1948	3,225	.50	1,604	2,871	.55	1,584
1949	3,368	.49	1,666	2,942	.56	1,644
1950	2,515	.59	1,481	2,409	.61	1,477
1951	2,946	.52	1,525	2,809	.54	1,520
1952	4,134	.50	2,051	3,916	.52	2,042
1953	2,530	.59	1,503	2,439	.62	1,500
1954	1,565	.83	1,303	1,526	.85	1,303
1955	1,946	.70	1,358	1,896	.72	1,356
1956	2,392	.59	1,399	2,343	.60	1,398
1957	4,325	.45	1,966	4,285	.46	1,966
1958	2,822	.55	1,543	2,792	.55	1,543
1959	2,261	.61	1,380	2,261	.61	1,380
1960	2,414	.58	1,408	2,414	.58	1,408
1961	2,034	.64	1,298	2,034	.64	1,298
Total	60,054		32,520	55,943		32,302
Average	2,860	0.54	1,549	2,664	0.58	1,538

Sampled quality record entire period.

Measured flow record entire period.

Table 8

Colorado River Basin

Flow and Quality of Water Data

Gunnison River near Grand Junction, Colorado

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	51	1.90	97	52	1.88	98
	Feb.	50	1.82	93	51	1.84	94
	March	63	1.67	105	65	1.63	106
	April	123	1.00	123	125	1.00	125
	May	871	.40	349	865	.41	353
	June	563	.46	259	554	.47	263
1941	July	192	.94	180	183	1.01	184
	Aug.	95	1.41	134	88	1.56	138
	Sept.	81	2.11	171	76	2.28	174
	Oct.	198	1.35	267	201	1.34	270
	Nov.	121	1.33	161	123	1.32	163
	Dec.	84	1.58	133	86	1.55	134
	Total	2,492	.83	2,072	2,469	.85	2,102
	Jan.	71	1.59	113	72	1.58	114
	Feb.	62	1.66	103	63	1.65	104
	March	76	1.64	125	77	1.64	126
	April	546	.52	284	548	.52	286
	May	759	.47	357	754	.48	360
	June	688	.38	261	681	.39	265
1942	July	167	.93	156	159	1.00	159
	Aug.	68	2.18	148	62	2.44	151
	Sept.	56	2.36	132	52	2.60	135
	Oct.	57	2.58	147	60	2.48	149
	Nov.	65	1.92	125	67	1.89	127
	Dec.	58	1.83	106	59	1.81	107
	Total	2,673	.77	2,057	2,654	.78	2,083
	Jan.	57	1.72	98	58	1.71	99
	Feb.	48	1.60	77	49	1.59	78
	March	56	1.55	87	57	1.54	88
	April	280	.44	123	282	.44	124
	May	389	.48	187	385	.49	190
	June	397	.46	183	390	.48	186
1943	July	113	1.08	122	106	1.18	125
	Aug.	154	1.43	220	150	1.49	223
	Sept.	87	1.59	138	83	1.69	140
	Oct.	69	1.84	127	71	1.82	129
	Nov.	75	1.59	119	77	1.56	120
	Dec.	61	1.57	96	62	1.56	97
	Total	1,786	.88	1,577	1,770	.90	1,599
	Jan.	51	1.65	84	52	1.63	85
	Feb.	48	1.44	69	49	1.43	70
	March	53	1.42	75	54	1.41	76
	April	102	.97	99	104	.97	101
	May	758	.32	242	753	.32	245
	June	694	.33	229	687	.34	233
1944	July	230	.69	159	222	.73	162
	Aug.	51	1.94	99	45	2.27	102
	Sept.	45	2.44	110	41	2.76	113
	Oct.	58	2.31	134	61	2.23	136
	Nov.	71	1.86	132	73	1.84	134
	Dec.	64	1.73	111	65	1.72	112
	Total	2,225	.69	1,543	2,206	.71	1,569
	Jan.	55	1.58	87	56	1.57	88
	Feb.	47	1.62	76	48	1.60	77
	March	52	1.48	77	53	1.47	78
	April	91	1.00	91	93	.99	92
	May	628	.35	220	624	.36	223
	June	407	.46	187	400	.48	190
1945	July	164	.85	139	157	.90	142
	Aug.	122	1.22	149	118	1.29	152
	Sept.	46	2.39	110	42	2.67	112
	Oct.	76	2.00	152	78	1.97	154
	Nov.	73	1.63	119	75	1.60	120
	Dec.	58	1.59	92	59	1.58	93
	Total	1,819	.82	1,499	1,803	.84	1,521
	Jan.	58	1.55	90	59	1.54	91
	Feb.	48	1.44	69	49	1.43	70
	March	58	1.28	74	59	1.27	75
	April	182	.59	108	184	.59	109
	May	228	.59	135	223	.62	138
	June	321	.52	167	315	.54	170
1946	July	64	1.62	104	57	1.88	107
	Aug.	56	2.16	121	51	2.43	124
	Sept.	54	2.31	125	50	2.54	127
	Oct.	69	2.06	140	71	2.00	142
	Nov.	67	1.70	114	69	1.67	115
	Dec.	56	1.55	87	57	1.54	88
	Total	1,261	1.06	1,334	1,244	1.09	1,356
	Jan.	45	1.67	[illegible]	46	1.65	76
	Feb.	47	1.49	[illegible]	48	1.48	71
	March	55	1.27	70	56	1.27	71
	April	96	.82	79	97	.82	80
	May	455	.39	177	451	.40	179
	June	502	.46	231	496	.47	234
1947	July	242	.64	155	236	.67	158
	Aug.	120	1.50	180	116	1.57	182
	Sept.	95	1.63	155	92	1.71	157
	Oct.	114	1.60	183	116	1.59	185
	Nov.	96	1.35	130	97	1.35	131
	Dec.	70	1.41	99	71	1.41	100
	Total	1,937	.83	1,604	1,922	.85	1,624
	Jan.	58	1.38	80	59	1.37	81
	Feb.	65	1.43	93	66	1.42	94
	March	76	1.38	105	77	1.38	106
	April	324	.51	165	325	.51	166
	May	835	.30	251	831	.30	253
	June	546	.40	218	541	.41	220
1948	July	141	.92	129	135	.97	131
	Aug.	71	1.84	131	67	1.98	133
	Sept.	49	2.25	110	47	2.38	112
	Oct.	57	2.09	119	59	2.05	121
	Nov.	70	1.84	129	71	1.83	130
	Dec.	70	1.64	115	71	1.63	116
	Total	2,362	.70	1,645	2,349	.71	1,663
	Jan.	51	1.49	76	51	1.49	76
	Feb.	52	1.48	77	52	1.48	77
	March	69	1.42	98	70	1.41	99
	April	235	.57	134	236	.57	135
	May	481	.38	183	479	.38	184
	June	651	.42	273	648	.42	274
1949	July	265	.65	172	261	0.66	173
	Aug.	65	1.80	117	63	1.87	118
	Sept.	53	2.15	114	52	2.21	115
	Oct.	70	2.09	146	71	2.07	147
	Nov.	74	1.58	117	75	1.57	118
	Dec.	54	1.74	94	55	1.73	95
	Total	2,120	.76	1,601	2,113	.76	1,611
	Jan.	54	1.57	85	54	1.57	85
	Feb.	57	2.00	112	57	1.96	112
	March	60	1.33	80	61	1.33	81
	April	219	.50	110	220	.50	111
	May	309	.45	139	307	.46	140
	June	319	.50	160	316	.51	162
1950	July	88	1.43	126	84	1.52	128
	Aug.	37	2.16	80	34	2.38	81
	Sept.	46	2.61	120	44	2.75	121
	Oct.	37	2.65	98	38	2.61	99
	Nov.	49	2.12	104	50	2.10	105
	Dec.	60	1.73	104	61	1.72	105
	Total	1,335	.99	1,318	1,326	1.00	1,330
	Jan.	47	1.64	77	47	1.64	77
	Feb.	46	1.59	73	46	1.59	73
	March	55	1.27	70	55	1.29	71
	April	62	.97	60	63	.97	61
	May	265	.51	135	263	.52	136
	June	323	.52	168	320	.53	169
1951	July	93	1.06	99	90	1.11	100
	Aug.	53	1.72	91	50	1.84	92
	Sept.	37	2.30	85	36	2.39	86
	Oct.	49	2.41	118	50	2.38	119
	Nov.	60	1.88	113	61	1.87	114
	Dec.	46	1.65	76	47	1.64	77
	Total	1,136	1.03	1,165	1,128	1.04	1,175
	Jan.	53	1.53	81	53	1.53	81
	Feb.	48	1.48	71	48	1.48	71
	March	53	1.41	75	54	1.39	75
	April	342	.46	157	343	.46	158
	May	818	.33	270	816	.33	271
	June	759	.35	266	756	.35	267
1952	July	201	.79	158	198	.80	159
	Aug.	121	1.54	187	119	1.58	188
	Sept.	76	1.86	141	76	1.87	142
	Oct.	67	1.90	127	68	1.88	128
	Nov.	64	2.00	128	65	1.98	129
	Dec.	72	1.68	121	72	1.68	121
	Total	2,674	.67	1,782	2,668	.67	1,790

Table 8
Colorado River Basin
Flow and Quality of Water Data
Gunnison River near Grand Junction, Colorado

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	65	1.51	98	65	1.51	98
	Feb.	50	1.48	74	50	1.48	74
	March	61	1.26	77	62	1.26	78
	April	86	1.01	87	87	1.01	88
	May	230	.57	131	228	.58	132
	June	437	.43	188	434	.44	189
1953	July	86	1.13	97	82	1.20	98
	Aug.	67	1.75	117	65	1.82	118
	Sept.	46	2.28	105	45	2.36	106
	Oct.	58	2.40	139	59	2.37	140
	Nov.	74	1.78	132	75	1.77	133
	Dec.	52	1.83	95	53	1.81	96
	Total	1,312	1.02	1,340	1,305	1.03	1,350
	Jan.	49	1.75	84	49	1.75	84
	Feb.	45	1.58	71	45	1.58	71
	March	45	1.49	67	46	1.48	68
	April	70	.84	59	71	.85	60
	May	110	.85	93	108	.87	94
	June	39	1.92	75	36	2.11	76
1954	July	40	2.10	84	36	2.36	85
	Aug.	31	2.64	82	29	2.86	83
	Sept.	52	2.50	130	51	2.57	131
	Oct.	64	1.94	124	65	1.92	125
	Nov.	51	1.92	98	52	1.90	99
	Dec.	49	1.90	93	50	1.88	94
	Total	645	1.64	1,060	638	1.68	1,070
	Jan.	46	1.70	78	46	1.70	78
	Feb.	40	1.67	67	40	1.67	67
	March	59	1.47	87	59	1.47	87
	April	108	.74	80	108	.74	80
	May	262	.52	136	261	.52	137
	June	219	.63	138	217	.64	139
1955	July	46	1.74	80	44	1.84	81
	Aug.	52	1.86	97	51	1.92	98
	Sept.	35	2.48	87	34	2.59	88
	Oct.	38	2.47	94	39	2.44	95
	Nov.	54	2.08	112	55	2.04	112
	Dec.	57	1.65	94	57	1.65	94
	Total	1,016	1.13	1,150	1,011	1.14	1,156
	Jan.	50	1.64	82	50	1.64	82
	Feb.	44	1.59	70	44	1.59	70
	March	56	1.30	73	56	1.30	73
	April	142	.60	85	142	.60	85
	May	324	.45	146	324	.45	146
	June	262	.53	139	262	.53	140
1956	July	37	1.92	71	36	2.00	72
	Aug.	29	2.07	60	29	2.07	60
	Sept.	20	3.15	63	20	3.15	63
	Oct.	34	2.94	100	34	2.94	100
	Nov.	55	1.95	107	55	1.95	107
	Dec.	47	1.87	88	47	1.87	88
	Total	1,100	.99	1,084	1,099	.99	1,086
	Jan.	52	1.73	90	52	1.73	90
	Feb.	55	1.69	93	55	1.69	93
	March	56	1.36	76	57	1.35	77
	April	135	.67	91	136	.68	92
	May	554	.44	244	552	.44	245
	June	1,168	.32	374	1,165	.32	375
1957	July	719	.39	281	715	.39	282
	Aug.	224	.83	186	222	.84	187
	Sept.	108	1.47	159	107	1.50	160
	Oct.	106	1.92	204	107	1.92	205
	Nov.	111	1.33	148	112	1.33	149
	Dec.	92	1.26	116	93	1.26	117
	Total	3,380	.61	2,062	3,373	.61	2,072
	Jan.	65	1.40	91	65	1.40	91
	Feb.	70	1.50	105	70	1.50	105
	March	82	1.24	102	82	1.24	102
	April	254	.57	145	254	.57	145
	May	873	.32	279	872	.32	280
	June	570	.42	239	569	.42	240
1958	July	65	1.52	99	63	1.59	100
	Aug.	43	1.74	75	42	1.81	76
	Sept.	51	2.31	118	51	2.33	119
	Oct.	52	2.42	126	53	2.40	127
	Nov.	71	1.82	129	71	1.82	129
	Dec.	65	1.60	104	65	1.60	104
	Total	2,261	.71	1,612	2,257	.72	1,618

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	57	1.58	[illegible]	Same as historical		
	Feb.	49	1.51	[illegible]			
	March	52	1.34	[illegible]			
	April	65	1.10	[illegible]			
	May	157	.75	[illegible]			
	June	256	.62	159			
1959	July	34	2.18	74			
	Aug.	51	2.01	103			
	Sept.	41	2.46	101			
	Oct.	96	1.45	139			
	Nov.	72	1.39	100			
	Dec.	50	1.54	77			
	Total	981	1.20	1,174			
	Jan.	49	1.46	72			
	Feb.	41	1.48	61			
	March	87	1.36	110			
	April	270	.45	122			
	May	259	.45	117			
	June	336	.46	155			
1960	July	58	1.33	77			
	Aug.	34	2.08	71			
	Sept.	38	2.22	84			
	Oct.	51	2.34	119			
	Nov.	58	1.69	98			
	Dec.	51	1.59	81			
	Total	1,332	.88	1,167			
	Jan.	41	1.65	68			
	Feb.	39	1.55	60			
	March	55	1.29	71			
	April	67	1.05	70			
	May	266	.50	133			
	June	209	.62	130			
1961	July	34	2.09	71			
	Aug.	44	2.07	91			
	Sept.	100	1.66	166			
	Oct.	107	1.20	128			
	Nov.	86	1.20	103			
	Dec.	57	1.37	78			
	Total	1,105	1.06	1,169			

ANNUAL SUMMARY

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	2,492	0.83	2,072	2,469	0.85	2,102
1942	2,673	.77	2,057	2,654	.78	2,083
1943	1,786	.88	1,577	1,770	.90	1,599
1944	2,225	.69	1,543	2,206	.71	1,569
1945	1,819	.82	1,499	1,803	.84	1,521
1946	1,261	1.06	1,334	1,244	1.09	1,356
1947	1,937	.83	1,604	1,922	.85	1,624
1948	2,362	.70	1,645	2,349	.71	1,663
1949	2,120	.76	1,601	2,113	.76	1,611
1950	1,335	.99	1,318	1,326	1.00	1,330
1951	1,136	1.03	1,165	1,128	1.04	1,175
1952	2,674	.67	1,782	2,6[illegible]	.67	1,790
1953	1,312	1.02	1,340	1,305	1.03	1,350
1954	645	1.64	1,060	638	1.68	1,070
1955	1,016	1.13	1,150	1,011	1.14	1,156
1956	1,100	.99	1,084	1,099	.99	1,086
1957	3,380	.61	2,062	3,373	.61	2,072
1958	2,261	.71	1,612	2,257	.72	1,618
1959	981	1.20	1,174	981	1.20	1,174
1960	1,332	.88	1,167	1,332	.88	1,167
1961	1,105	1.06	1,169	1,105	1.06	1,169
Total	36,952		31,015	36,753		31,285
Average	1,760	0.84	1,477	1,750	0.85	1,490

Sampled quality record entire period.

Measured flow record entire period.

Table 9

Colorado River Basin

Flow and Quality of Water Data

Colorado River near Cisco, Utah

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	139	1.86	259	126	2.05	259
	Feb.	153	1.78	272	140	1.94	272
	March	206	1.64	337	190	1.77	337
	April	445	1.00	445	433	1.03	446
	May	2,355	.42	989	2,286	.44	995
	June	1,582	.46	728	1,449	.51	740
1941	July	579	.73	423	485	.91	443
	Aug.	251	1.67	419	193	2.27	438
	Sept.	237	1.81	430	206	2.15	443
	Oct.	579	1.10	637	578	1.12	647
	Nov.	311	1.18	367	309	1.22	376
	Dec.	229	1.51	346	226	1.57	354
	Total	7,066	.80	5,652	6,621	.87	5,750
	Jan.	181	1.67	302	164	1.84	302
	Feb.	166	1.73	288	149	1.93	288
	March	228	1.52	347	206	1.68	347
	April	1,344	.61	820	1,328	.62	821
	May	1,809	.45	814	1,730	.47	819
	June	1,961	.37	725	1,806	.41	735
1942	July	579	.78	451	470	.99	467
	Aug.	185	1.84	340	121	2.94	356
	Sept.	134	2.46	329	100	3.42	342
	Oct.	162	2.33	378	157	2.46	386
	Nov.	186	1.99	370	179	2.11	378
	Dec.	164	1.96	322	156	2.11	329
	Total	7,099	.77	5,486	6,566	.85	5,570
	Jan.	153	1.90	291	140	2.08	291
	Feb.	146	1.85	270	133	2.03	270
	March	174	1.77	308	158	1.95	308
	April	709	.64	454	697	.65	454
	May	996	.46	458	935	.49	462
	June	1,365	.38	518	1,244	.42	525
1943	July	502	.78	392	417	.97	405
	Aug.	368	1.26	463	319	1.49	476
	Sept.	212	1.85	392	185	2.17	401
	Oct.	184	1.84	339	180	1.92	346
	Nov.	215	1.47	317	210	1.54	323
	Dec.	190	1.56	296	184	1.64	301
	Total	5,214	.86	4,498	4,802	.95	4,562
	Jan.	140	1.77	248	128	1.94	248
	Feb.	152	1.56	237	140	1.69	237
	March	166	1.51	251	151	1.66	251
	April	304	1.09	331	293	1.13	332
	May	1,784	.41	732	1,722	.43	737
	June	1,843	.35	645	1,726	.38	657
1944	July	677	.61	413	595	.72	430
	Aug.	149	1.62	241	199	1.29	257
	Sept.	99	2.54	252	72	3.68	265
	Oct.	159	2.18	347	159	2.23	355
	Nov.	196	1.78	348	194	1.83	356
	Dec.	171	1.70	291	168	1.77	298
	Total	5,840	.74	4,336	5,547	.80	4,423
	Jan.	149	1.73	258	136	1.90	258
	Feb.	151	1.74	263	138	1.90	263
	March	178	1.56	277	162	1.71	277
	April	329	.88	289	317	.91	289
	May	1,495	.36	538	1,435	.38	542
	June	1,311	.37	485	1,192	.41	493
1945	July	676	.67	453	592	.79	466
	Aug.	446	1.01	451	397	1.17	464
	Sept.	146	1.85	270	119	2.34	279
	Oct.	217	1.75	380	213	1.82	387
	Nov.	224	1.41	316	219	1.47	322
	Dec.	183	1.26	230	177	1.33	235
	Total	5,505	.76	4,210	5,097	.84	4,275
	Jan.	174	1.37	239	164	1.46	239
	Feb.	155	1.27	197	145	1.36	197
	March	191	1.24	236	178	1.32	236
	April	525	.61	320	516	.62	320
	May	726	.49	356	672	.54	360
	June	1,027	.42	432	928	.47	441
1946	July	309	.98	303	237	1.33	316
	Aug.	196	1.66	325	154	2.20	339
	Sept.	135	2.10	283	112	2.61	292
	Oct.	206	1.85	382	205	1.89	389
	Nov.	206	1.56	322	205	1.60	328
	Dec.	208	1.37	285	205	1.42	291
	Total	4,058	.91	3,680	3,721	1.01	3,748
	Jan.	145	1.58	229	127	1.80	229
	Feb.	151	1.44	217	133	1.63	217
	March	189	1.39	263	166	1.58	263
	April	316	.85	268	298	.90	268
	May	1,423	.40	569	1,349	.42	571
	June	1,594	.39	621	1,441	.44	627
1947	July	985	.47	463	876	.54	473
	Aug.	369	1.21	447	307	1.49	458
	Sept.	259	1.44	373	227	1.68	382
	Oct.	328	1.47	483	318	1.54	489
	Nov.	277	1.24	343	266	1.31	346
	Dec.	223	1.40	312	211	1.50	317
	Total	6,259	.73	4,588	5,719	.81	4,642
	Jan.	191	1.34	257	178	1.44	257
	Feb.	210	1.33	280	197	1.42	280
	March	245	1.36	333	228	1.46	333
	April	830	.64	531	817	.65	531
	May	1,959	.36	705	1,906	.37	707
	June	1,499	.39	585	1,390	.42	587
1948	July	446	.86	384	365	1.07	390
	Aug.	225	1.52	342	180	1.94	349
	Sept.	121	1.88	228	98	2.38	233
	Oct.	175	1.96	344	167	2.08	346
	Nov.	204	1.67	341	195	1.76	344
	Dec.	186	1.66	308	177	1.76	311
	Total	6,291	.74	4,638	5,898	.79	4,670
	Jan.	188	1.54	289	171	1.68	288
	Feb.	187	1.35	253	170	1.48	252
	March	243	1.40	340	223	1.52	340
	April	615	.67	412	599	.69	412
	May	1,289	.41	529	1,233	.43	529
	June	1,910	.37	707	1,788	.39	706
1949	July	908	.55	499	819	.61	501
	Aug.	224	1.58	354	175	2.04	356
	Sept.	158	2.08	328	134	2.47	331
	Oct.	225	1.83	411	212	1.95	413
	Nov.	210	1.71	359	197	1.83	361
	Dec.	180	1.66	299	165	1.82	301
	Total	6,337	.75	4,780	5,886	.81	4,792
	Jan.	199	1.52	302	195	1.55	302
	Feb.	201	1.44	289	197	1.47	289
	March	209	1.31	274	205	1.34	275
	April	541	.61	330	538	.61	331
	May	764	.51	389	742	.52	390
	June	1,113	.42	467	1,072	.44	472
1950	July	347	1.03	357	317	1.15	364
	Aug.	109	2.02	220	91	2.47	225
	Sept.	138	2.12	292	128	2.32	297
	Oct.	125	2.35	294	125	2.38	298
	Nov.	161	1.96	316	161	1.99	320
	Dec.	167	1.75	293	167	1.77	296
	Total	4,074	.94	3,823	3,938	.98	3,859
	Jan.	153	1.69	258	148	1.74	258
	Feb.	151	1.51	228	146	1.56	228
	March	161	1.46	236	154	1.54	237
	April	173	1.21	209	169	1.24	210
	May	758	.54	409	733	.56	410
	June	1,173	.43	505	1,123	.45	508
1951	July	530	.68	360	494	.74	366
	Aug.	238	1.47	350	216	1.65	356
	Sept.	131	2.06	270	120	2.29	275
	Oct.	169	1.99	336	169	2.01	340
	Nov.	178	1.74	310	177	1.77	314
	Dec.	172	1.67	287	171	1.70	291
	Total	3,987	.94	3,758	3,820	.99	3,793
	Jan.	191	1.59	303	182	1.66	303
	Feb.	156	1.65	257	147	1.75	257
	March	194	1.48	287	184	1.55	286
	April	969	.53	514	961	.52	515
	May	2,152	.35	753	2,119	.36	754
	June	2,314	.33	764	2,245	.34	766
1952	July	641	.72	462	593	.79	467
	Aug.	358	1.18	422	331	1.29	427
	Sept.	213	1.58	337	200	1.70	341
	Oct.	166	1.92	318	161	1.99	321
	Nov.	177	1.89	334	172	1.96	337
	Dec.	188	1.66	313	181	1.74	315
	Total	7,719	.66	5,064	7,476	.68	5,089

Table 9

Colorado River Basin

Flow and Quality of Water Data

Colorado River near Cisco, Utah

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1953	Jan.	185	1.65	306	181	1.69	306
	Feb.	142	1.63	232	138	1.68	232
	March	187	1.52	284	183	1.56	285
	April	250	1.00	250	247	1.02	251
	May	606	.60	364	588	.62	365
	June	1,399	.41	574	1,365	.42	577
	July	353	.95	335	328	1.03	339
	Aug.	256	1.23	315	242	1.32	320
	Sept.	128	2.22	284	120	2.40	288
	Oct.	177	1.89	334	178	1.89	337
	Nov.	207	1.77	366	207	1.78	369
	Dec.	171	1.75	299	171	1.76	301
	Total	4,061	.97	3,943	3,948	1.01	3,970
1954	Jan.	177	1.76	312	175	1.78	312
	Feb.	143	1.65	236	141	1.67	236
	March	161	1.46	236	160	1.48	237
	April	221	.98	217	220	.99	218
	May	436	.74	323	423	.77	325
	June	217	1.17	254	197	1.31	258
	July	150	1.69	253	136	1.90	259
	Aug.	98	2.30	225	89	2.58	230
	Sept.	171	2.09	358	167	2.17	362
	Oct.	215	1.59	342	217	1.59	345
	Nov.	164	1.70	278	165	1.70	281
	Dec.	140	1.90	266	141	1.91	269
	Total	2,293	1.44	3,300	2,231	1.49	3,332
1955	Jan.	134	1.84	247	132	1.87	247
	Feb.	121	1.78	215	119	1.81	215
	March	198	1.33	263	196	1.34	263
	April	321	.82	263	319	.82	263
	May	752	.50	376	741	.51	378
	June	689	.55	379	669	.57	381
	July	214	1.21	259	199	1.32	262
	Aug.	185	1.66	307	177	1.76	311
	Sept.	108	2.16	233	103	2.29	236
	Oct.	119	2.19	261	120	2.19	263
	Nov.	169	1.89	319	170	1.88	320
	Dec.	176	1.70	299	175	1.71	300
	Total	3,186	1.07	3,421	3,120	1.10	3,439
1956	Jan.	155	1.69	262	153	1.71	262
	Feb.	141	1.70	239	139	1.72	239
	March	187	1.50	281	185	1.52	281
	April	356	.72	256	354	.72	256
	May	1,005	.45	452	998	.45	452
	June	924	.44	406	910	.45	407
	July	172	1.47	253	161	1.58	255
	Aug.	119	1.97	234	113	2.08	235
	Sept.	81	2.38	193	79	2.45	194
	Oct.	121	2.22	269	120	2.24	269
	Nov.	165	1.87	308	163	1.89	308
	Dec.	142	1.94	275	140	1.96	275
	Total	3,568	.96	3,428	3,515	.98	3,433
1957	Jan.	164	1.80	296	162	1.83	296
	Feb.	168	1.55	260	166	1.57	260
	March	167	1.56	260	166	1.57	261
	April	398	.86	342	397	.86	343
	May	1,375	.44	605	1,361	.45	607
	June	2,859	.29	829	2,837	.29	834
	July	1,952	.37	722	1,936	.38	729
	Aug.	661	.83	549	650	.85	555
	Sept.	314	1.21	380	309	1.24	385
	Oct.	292	1.78	520	295	1.77	523
	Nov.	300	1.44	431	302	1.44	434
	Dec.	239	1.71	408	241	1.70	411
	Total	8,889	.63	5,602	8,822	.64	5,638
1958	Jan.	200	1.52	304	199	1.53	304
	Feb.	225	1.34	302	224	1.35	302
	March	254	1.29	328	252	1.30	328
	April	756	.53	401	755	.53	401
	May	2,032	.31	630	2,022	.31	632
	June	1,560	.40	624	1,545	.41	628
	July	234	1.22	285	222	1.31	290
	Aug.	109	2.17	236	102	2.35	240
	Sept.	153	2.14	328	150	2.21	331
	Oct.	155	1.99	308	157	1.98	311
	Nov.	190	1.66	315	191	1.66	317
	Dec.	176	1.63	287	177	1.63	288
	Total	6,044	.72	4,348	5,996	.73	4,372
1959	Jan.	168	1.71	287	Same as historical		
	Feb.	153	1.41	216			
	March	150	1.60	240			
	April	163	1.39	227			
	May	536	.65	348			
	June	924	.50	[illegible]			
	July	214	1.15	[illegible]			
	Aug.	160	1.91	[illegible]			
	Sept.	124	2.14	[illegible]			
	Oct.	250	1.43	[illegible]			
	Nov.	210	1.31	[illegible]			
	Dec.	163	1.54	[illegible]			
	Total	3,215	1.08	3,481			
1960	Jan.	164	1.51	248			
	Feb.	143	1.51	216			
	March	273	1.22	333			
	April	629	.51	321			
	May	758	.49	371			
	June	1,068	.42	448			
	July	251	1.04	261			
	Aug.	106	1.96	208			
	Sept.	117	2.16	253			
	Oct.	153	1.94	297			
	Nov.	177	1.67	296			
	Dec.	165	1.48	244			
	Total	4,004	.87	3,496			
1961	Jan.	156	1.43	222			
	Feb.	140	1.52	213			
	March	162	1.44	233			
	April	206	1.14	235			
	May	677	.57	386			
	June	664	.51	339			
	July	130	1.62	211			
	Aug.	138	2.01	277			
	Sept.	316	1.49	471			
	Oct.	357	1.07	382			
	Nov.	252	1.23	310			
	Dec.	197	1.40	276			
	Total	3,395	1.05	3,555			

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Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	7,066	0.80	5,652	6,621	0.87	5,750
1942	7,099	.77	5,486	6,566	.85	5,570
1943	5,214	.86	4,498	4,802	.95	[illegible]
1944	5,840	.74	4,336	5,547	.80	[illegible]
1945	5,505	.76	4,210	5,097	.84	[illegible]
1946	4,058	.91	3,680	3,721	1.01	3,748
1947	6,259	.73	4,588	5,719	.81	[illegible]
1948	6,291	.74	4,638	5,898	.79	4,670
1949	6,337	.75	4,780	5,886	.81	[illegible]
1950	4,074	.94	3,823	3,938	.98	[illegible]
1951	3,987	.94	3,758	3,820	.99	3,793
1952	7,719	.66	5,064	7,476	.78	5,089
1953	4,061	.97	3,943	3,948	1.01	3,970
1954	2,293	1.44	3,300	2,231	1.49	3,332
1955	3,186	1.07	3,421	3,120	1.10	3,439
1956	3,568	.96	3,428	3,515	.98	3,433
1957	8,889	.63	5,602	8,822	.64	5,638
1958	6,044	.72	4,348	5,996	.73	4,372
1959	3,215	1.08	3,481	3,215	1.08	3,481
1960	4,004	.87	3,496	4,004	.87	3,496
1961	3,395	1.05	3,555	3,395	1.05	3,555
Total	108,104		89,087	103,337		89,889
Average	5,148	0.82	4,242	4,921	0.87	4,280

Sampled quality record entire period.

Measured flow record entire period.

Table 10
Colorado River Basin
Flow and Quality of Water Data
San Juan River near Archuleta, New Mexico

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	22	0.41	9	Same as historical		
	Feb.	46	.35	16			
	March	98	.38	37			
	April	251	.21	53			
	May	709	.16	110			
	June	560	.12	68			
1941	July	324	.14	46			
	Aug.	84	.19	16			
	Sept.	68	.24	16			
	Oct.	273	.12	33			
	Nov.	87	.17	15			
	Dec.	52	.21	11			
	Total	2,574	.17	430			
	Jan.	45	.33	15			
	Feb.	48	.25	12			
	March	54	.42	23			
	April	383	.21	82			
	May	320	.15	48			
	June	310	.12	38			
1942	July	76	.18	14			
	Aug.	41	.22	9			
	Sept.	28	.25	7			
	Oct.	23	.26	6			
	Nov.	22	.27	6			
	Dec.	16	.38	6			
	Total	1,366	.19	266			
	Jan.	16	.44	7			
	Feb.	26	.35	9			
	March	55	.38	21			
	April	198	.19	37			
	May	184	.16	30			
	June	134	.15	20			
1943	July	51	.24	12			
	Aug.	48	.21	10			
	Sept.	28	.25	7			
	Oct.	35	.20	7			
	Nov.	24	.29	7			
	Dec.	19	.32	6			
	Total	818	.21	173			
	Jan.	16	.38	6			
	Feb.	19	.32	6			
	March	34	.47	16			
	April	131	.21	27			
	May	371	.16	61			
	June	382	.13	49			
1944	July	134	.16	22			
	Aug.	45	.20	9			
	Sept.	43	.23	10			
	Oct.	41	.22	9			
	Nov.	21	.29	6			
	Dec.	14	.43	6			
	Total	1,251	.18	227			
	Jan.	14	.43	6			
	Feb.	22	.45	10			
	March	35	.49	17			
	April	143	.20	28			
	May	278	.16	44			
	June	209	.13	28			
1945	July	68	.21	14			
	Aug.	40	.22	9			
	Sept.	21	.24	5			
	Oct.	30	.37	11			
	Nov.	19	.37	7			
	Dec.	12	.46	6			
	Total	891	.21	185			
	Jan.	14	.43	6			
	Feb.	17	.47	8			
	March	22	.50	11			
	April	66	.23	15			
	May	73	.18	13			
	June	87	.18	16			
1946	July	27	.33	9			
	Aug.	40	.35	14			
	Sept.	29	.31	9			
	Oct.	36	.31	11			
	Nov.	26	.35	9			
	Dec.	19	.32	6			
	Total	456	.28	127			
	Jan.	15	0.40	6	Same as historical		
	Feb.	24	.38	9			
	March	32	.34	11			
	April	50	.24	[illegible]			
	May	186	.17	[illegible]			
	June	140	.13	[illegible]			
1947	July	43	.28	[illegible]			
	Aug.	73	.30	[illegible]			
	Sept.	56	.23	[illegible]			
	Oct.	77	.21	16			
	Nov.	37	.22	8			
	Dec.	27	.26	7			
	Total	760	.22	166			
	Jan.	27	.26	7			
	Feb.	39	.33	13			
	March	43	.35	15			
	April	246	.20	49			
	May	306	.14	43			
	June	338	.12	40			
1948	July	79	.16	13			
	Aug.	49	.24	12			
	Sept.	22	.32	7			
	Oct.	23	.35	8			
	Nov.	18	.39	7			
	Dec.	13	.46	6			
	Total	1,203	.18	220			
	Jan.	16	.44	7			
	Feb.	25	.36	9			
	March	73	.37	27			
	April	228	.24	55			
	May	318	.15	48			
	June	406	.13	53			
1949	July	199	.15	30			
	Aug.	57	.24	14			
	Sept.	33	.27	9			
	Oct.	30	.30	9			
	Nov.	21	.38	8			
	Dec.	14	.50	7			
	Total	1,420	.19	276			
	Jan.	16	.37	6			
	Feb.	29	.41	12			
	March	31	.42	13			
	April	116	.19	22			
	May	126	.15	19			
	June	112	.16	18			
1950	July	44	.27	12			
	Aug.	20	.35	7			
	Sept.	24	.38	9			
	Oct.	20	.35	7			
	Nov.	14	.50	7			
	Dec.	12	.50	6			
	Total	564	.24	138			
	Jan.	10	.50	5			
	Feb.	11	.45	5			
	March	20	.45	9			
	April	35	.29	10			
	May	117	.18	21			
	June	94	.17	16			
1951	July	21	.38	8			
	Aug.	33	.36	12			
	Sept.	22	.36	8			
	Oct.	17	.47	8			
	Nov.	15	.47	7			
	Dec.	18	.44	8			
	Total	413	.28	117			
	Jan.	19	.53	10			
	Feb.	19	.53	10			
	March	47	.49	23			
	April	326	.26	85			
	May	396	.16	63			
	June	454	.13	59			
1952	July	136	.18	24			
	Aug.	66	.26	17			
	Sept.	33	.27	9			
	Oct.	22	.32	7			
	Nov.	16	.44	7			
	Dec.	18	.39	7			
	Total	1,552	.21	321			

Table 10

Colorado River Basin

Flow and Quality of Water Data

San Juan River near Archuleta, New Mexico

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
					Same as historical		
1953	Jan.	18	0.39	7			
	Feb.	18	.39	7			
	March	37	.41	15			
	April	75	.24	18			
	May	117	.19	22			
	June	148	.15	22			
	July	41	.32	13			
	Aug.	33	.33	11			
	Sept.	16	.44	7			
	Oct.	23	.43	10			
	Nov.	23	.43	10			
	Dec.	14	.50	7			
	Total	563	.26	149			
1954	Jan.	11	.45	5			
	Feb.	21	.48	10			
	March	28	.46	13			
	April	90	.21	19			
	May	143	.18	26			
	June	67	.19	13			
	July	37	.41	15			
	Aug.	45	.29	13			
	Sept.	30	.43	13			
	Oct.	42	.24	10			
	Nov.	18	.39	7			
	Dec.	13	.46	6			
	Total	545	.28	150			
1955	Jan.	12	.42	5			
	Feb.	13	.31	4			
	March	27	.37	10			
	April	45	.24	11			
	May	132	.18	24			
	June	119	.16	19			
	July	42	.29	12			
	Aug.	67	.28	19			
	Sept.	28	.29	8			
	Oct.	20	.30	6			
	Nov.	17	.35	6			
	Dec.	15	.40	6			
	Total	537	.24	130			
1956	Jan.	16	.38	6			
	Feb.	15	.40	6			
	March	48	.33	16			
	April	79	.20	16			
	May	174	.14	24			
	June	117	.15	18			
	July	25	.32	8			
	Aug.	23	.35	8			
	Sept.	11	.36	4			
	Oct.	12	.42	5			
	Nov.	11	.45	5			
	Dec.	9	.44	4			
	Total	540	.22	120			
1957	Jan.	13	.46	6			
	Feb.	30	.47	14			
	March	46	.43	20			
	April	120	.28	34			
	May	222	.19	42			
	June	480	.13	62			
	July	326	.16	52			
	Aug.	164	.22	36			
	Sept.	67	.19	13			
	Oct.	67	.30	20			
	Nov.	68	.26	18			
	Dec.	44	.30	13			
	Total	1,647	.20	330			
1958	Jan.	22	.36	8			
	Feb.	51	.43	22			
	March	77	.42	32			
	April	279	.30	84			
	May	460	.17	78			
	June	270	.13	35			
	July	42	.26	11			
	Aug.	35	.31	11			
	Sept.	40	.30	12			
	Oct.	25	.36	9			
	Nov.	17	.41	7			
	Dec.	14	.43	6			
	Total	1,332	.24	315			

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
					Same as historical		
1959	Jan.	11	0.45	5			
	Feb.	14	.43	6			
	March	18	.44	8			
	April	37	.30	11			
	May	87	.18	16			
	June	84	.15	13			
	July	18	.33	6			
	Aug.	34	.32	11			
	Sept.	15	.33	5			
	Oct.	60	.30	18			
	Nov.	39	.31	12			
	Dec.	20	.35	7			
	Total	437	.27	118			
1960	Jan.	14	.43	6			
	Feb.	16	.44	7			
	March	175	.34	60			
	April	240	.19	46			
	May	193	.17	33			
	June	232	.13	30			
	July	55	.24	13			
	Aug.	25	.28	7			
	Sept.	23	.30	7			
	Oct.	26	.38	10			
	Nov.	16	.44	7			
	Dec.	14	.50	7			
	Total	1,029	.23	233			
1961	Jan.	12	.42	5			
	Feb.	16	.44	7			
	March	43	.43	19			
	April	113	.26	29			
	May	192	.15	29			
	June	122	.16	19			
	July	38	.29	11			
	Aug.	52	.29	15			
	Sept.	58	.26	15			
	Oct.	52	.23	12			
	Nov.	34	.29	10			
	Dec.	18	.33	6			
	Total	750	.24	177			

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Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
				Same as historical		
1941	2,574	0.17	430			
1942	1,366	.19	266			
1943	818	.21	173			
1944	1,251	.18	227			
1945	891	.21	185			
1946	456	.28	127			
1947	760	.22	166			
1948	1,203	.18	220			
1949	1,420	.19	276			
1950	564	.24	138			
1951	413	.28	117			
1952	1,552	.21	321			
1953	563	.26	149			
1954	545	.28	150			
1955	537	.24	130			
1956	540	.22	120			
1957	1,647	.20	330			
1958	1,332	.24	315			
1959	437	.27	118			
1960	1,029	.23	233			
1961	750	.24	177			
Total	20,648		4,368			
Average	983	0.21	208			

Sampled quality record, October 1945 to December 1961; remainder by correlation. Measured flow record entire period. Adjusted quality and flow record for station near Blanco October 1945 to November 1954.

Table 11
Colorado River Basin
Flow and Quality of Water Data
San Juan River near Bluff, Utah

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	78	1.01	79	Same as historical		
	Feb.	127	.98	124			
	March	211	.78	165			
	April	392	.62	243			
	May	1,323	.50	662			
	June	915	.30	275			
1941	July	526	.30	158			
	Aug.	174	.70	122			
	Sept.	202	.87	176			
	Oct.	655	.64	419			
	Nov.	191	.61	117			
	Dec.	104	.81	84			
	Total	4,898	.54	2,624			
	Jan.	81	.93	75			
	Feb.	68	.93	63			
	March	126	.95	120			
	April	602	.51	307			
	May	479	.38	182			
	June	533	.26	139			
1942	July	150	.48	72			
	Aug.	51	.82	42			
	Sept.	38	1.00	38			
	Oct.	37	1.22	45			
	Nov.	39	1.23	48			
	Dec.	43	1.26	54			
	Total	2,247	.53	1,185			
	Jan.	43	1.26	54			
	Feb.	49	1.18	58			
	March	95	1.09	104			
	April	293	.47	138			
	May	332	.39	129			
	June	254	.38	96			
1943	July	106	.57	60			
	Aug.	91	1.01	92			
	Sept.	62	.90	56			
	Oct.	58	1.00	58			
	Nov.	59	.97	57			
	Dec.	51	1.12	57			
	Total	1,493	.64	959			
	Jan.	37	1.16	43			
	Feb.	49	1.14	56			
	March	76	1.06	81			
	April	204	.62	126			
	May	640	.36	230			
	June	705	.25	176			
1944	July	283	.35	99			
	Aug.	61	.85	52			
	Sept.	66	.92	61			
	Oct.	75	.91	68			
	Nov.	52	1.12	58			
	Dec.	43	1.19	51			
	Total	2,291	.48	1,101			
	Jan.	41	1.22	50			
	Feb.	63	1.13	71			
	March	72	1.03	74			
	April	196	.61	120			
	May	456	.35	160			
	June	377	.29	109			
1945	July	128	.50	64			
	Aug.	96	1.13	108			
	Sept.	22	1.18	26			
	Oct.	62	1.10	68			
	Nov.	46	1.04	48			
	Dec.	30	1.27	38			
	Total	1,589	.59	936			
	Jan.	37	1.14	42			
	Feb.	36	1.19	43			
	March	47	1.04	49			
	April	95	.66	63			
	May	125	.49	61			
	June	204	.40	82			
1946	July	63	.86	54			
	Aug.	75	1.12	84			
	Sept.	44	.93	41			
	Oct.	55	.98	54			
	Nov.	60	1.02	61			
	Dec.	46	1.02	47			
	Total	887	.77	681			
	Jan.	31	1.13	35	Same as historical		
	Feb.	45	1.07	48			
	March	51	.90	46			
	April	68	.63	43			
	May	329	.38	125			
	June	276	.30	[illegible]			
1947	July	110	.41	46			
	Aug.	294	1.01	[illegible]			
	Sept.	124	.73	91			
	Oct.	207	.78	[illegible]			
	Nov.	77	.73	[illegible]			
	Dec.	65	.86	56			
	Total	1,677	.65	1,087			
	Jan.	52	.83	43			
	Feb.	79	.84	66			
	March	90	.83	75			
	April	358	.37	133			
	May	519	.27	140			
	June	603	.28	169			
1948	July	147	.41	60			
	Aug.	86	.78	67			
	Sept.	36	1.11	40			
	Oct.	75	1.05	79			
	Nov.	55	1.07	59			
	Dec.	41	1.12	46			
	Total	2,141	.46	977			
	Jan.	63	1.11	70			
	Feb.	74	.99	73			
	March	152	.81	123			
	April	338	.45	152			
	May	503	.31	156			
	June	748	.31	232			
	July	342	.33	113			
1949	Aug.	90	.66	59			
	Sept.	42	1.05	44			
	Oct.	56	1.00	56			
	Nov.	45	1.07	48			
	Dec.	34	1.26	43			
	Total	2,487	.47	1,169			
	Jan.	41	1.12	46			
	Feb.	49	1.08	53			
	March	56	.93	52			
	April	136	.46	62			
	May	169	.40	68			
	June	191	.38	73			
1950	July	68	.72	49			
	Aug.	15	1.13	17			
	Sept.	42	1.14	48			
	Oct.	30	1.07	32			
	Nov.	25	1.44	36			
	Dec.	32	1.34	43			
	Total	854	.68	579			
	Jan.	30	1.30	39			
	Feb.	29	1.41	41			
	March	34	1.15	39			
	April	34	.85	29			
	May	142	.51	72			
	June	188	.36	68			
1951	July	30	.80	24			
	Aug.	49	1.06	52			
	Sept.	45	1.07	48			
	Oct.	35	1.23	43			
	Nov.	39	1.10	43			
	Dec.	36	1.28	46			
	Total	691	.79	544			
	Jan.	88	1.16	102			
	Feb.	40	1.20	48			
	March	87	1.03	90			
	April	453	.42	190			
	May	618	.30	185			
	June	769	.24	185			
1952	July	238	.42	100			
	Aug.	83	.69	57			
	Sept.	56	.93	52			
	Oct.	38	1.05	40			
	Nov.	41	1.29	53			
	Dec.	43	1.26	54			
	Total	2,554	.45	1,156			

Table 11
Colorado River Basin
Flow and Quality of Water Data
San Juan River near Bluff, Utah

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	42	1.24	52	Same as historical		
	Feb.	36	1.17	42			
	March	56	1.02	57			
	April	107	.64	68			
	May	156	.44	69			
	June	267	.27	72			
1953	July	77	.84	65			
	Aug.	71	1.15	82			
	Sept.	12	1.50	18			
	Oct.	54	1.28	69			
	Nov.	55	1.13	62			
	Dec.	35	1.31	46			
	Total	968	.73	702			
	Jan.	32	1.34	43			
	Feb.	36	1.17	42			
	March	48	1.02	49			
	April	113	.53	60			
	May	218	.39	85			
	June	120	.48	58			
1954	July	120	1.03	123			
	Aug.	66	.86	57			
	Sept.	89	1.19	106			
	Oct.	95	.75	71			
	Nov.	39	1.05	41			
	Dec.	35	1.26	44			
	Total	1,011	.77	779			
	Jan.	31	1.26	39			
	Feb.	34	1.12	38			
	March	63	1.00	63			
	April	62	.74	46			
	May	186	.38	71			
	June	208	.32	67			
1955	July	65	.88	57			
	Aug.	143	1.07	153			
	Sept.	28	.82	23			
	Oct.	25	1.00	25			
	Nov.	31	1.26	39			
	Dec.	35	1.34	47			
	Total	911	.73	668			
	Jan.	41	1.22	50			
	Feb.	34	1.29	44			
	March	75	.83	62			
	April	107	.50	54			
	May	241	.35	84			
	June	203	.31	63			
1956	July	31	1.10	34			
	Aug.	36	1.33	48			
	Sept.	4	1.50	6			
	Oct.	13	1.54	20			
	Nov.	30	1.23	37			
	Dec.	25	1.40	35			
	Total	840	.64	537			
	Jan.	38	1.26	48			
	Feb.	64	1.05	67			
	March	71	.97	69			
	April	171	.55	94			
	May	327	.48	157			
	June	786	.28	220			
1957	July	566	.38	215			
	Aug.	364	.63	229			
	Sept.	142	.68	97			
	Oct.	150	.86	129			
	Nov.	141	.72	102			
	Dec.	88	.81	71			
	Total	2,908	.51	1,498			
	Jan.	53	1.02	54			
	Feb.	119	.92	109			
	March	159	.87	139			
	April	413	.48	198			
	May	742	.26	193			
	June	507	.25	126			
1958	July	74	.65	48			
	Aug.	42	1.02	43			
	Sept.	61	.95	58			
	Oct.	47	1.04	49			
	Nov.	43	1.23	53			
	Dec.	36	1.28	46			
	Total	2,296	.49	1,116			

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	30	1.39	42	Same as Historical		
	Feb.	31	1.36	42			
	March	32	1.27	41			
	April	39	.94	37			
	May	110	.52	[illegible]			
	June	156	.39	[illegible]			
1959	July	18	.81	[illegible]			
	Aug.	64	1.13	72			
	Sept.	11	1.53	17			
	Oct.	92	.86	79			
	Nov.	82	.82	67			
	Dec.	46	1.02	47			
	Total	711	.81	577			
	Jan.	37	1.26	47			
	Feb.	43	1.09	47			
	March	260	.73	190			
	April	336	.32	108			
	May	285	.34	97			
	June	382	.27	103			
1960	July	92	.53	49			
	Aug.	18	1.11	20			
	Sept.	17	1.24	21			
	Oct.	58	1.13	66			
	Nov.	40	1.22	49			
	Dec.	40	1.27	51			
	Total	1,608	.53	848			
	Jan.	35	1.33	47			
	Feb.	41	1.31	54			
	March	66	1.02	67			
	April	157	.56	88			
	May	285	.32	91			
	June	227	.31	70			
1961	July	43	.83	36			
	Aug.	87	1.05	91			
	Sept.	109	.88	96			
	Oct.	98	.77	75			
	Nov.	72	.93	67			
	Dec.	44	1.22	54			
	Total	1,264	.66	836			

ANNUAL SUMMARY

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	4,898	0.54	2,624	Same as Historical		
1942	2,247	.53	1,185			
1943	1,493	.64	959			
1944	2,291	.48	1,101			
1945	1,589	.59	936			
1946	887	.77	681			
1947	1,677	.65	1,087			
1948	2,141	.46	977			
1949	2,487	.47	1,169			
1950	854	.68	579			
1951	691	.79	544			
1952	2,554	.45	1,156			
1953	968	.73	702			
1954	1,011	.77	779			
1955	911	.73	668			
1956	840	.64	537			
1957	2,908	.51	1,498			
1958	2,296	.49	1,116			
1959	711	.81	577			
1960	1,608	.53	848			
1961	1,264	.66	836			
Total	36,327		20,559			
Average	1,730	0.57	979			

Sampled quality record entire period.

Measured flow record entire period.

Table 12

Colorado River Basin

Flow and Quality of Water Data

Colorado River at Lees Ferry, Arizona

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	348	1.36	474	337	1.41	476
	Feb.	423	1.29	546	411	1.33	547
	March	668	1.12	749	652	1.15	749
	April	1,091	.79	862	1,076	.80	863
	May	4,974	.45	2,239	4,873	.46	2,249
	June	4,004	.38	1,522	3,837	.40	1,541
1941	July	1,666	.51	850	1,552	.57	880
	Aug.	798	1.16	925	727	1.31	955
	Sept.	608	1.35	821	571	1.48	844
	Oct.	1,797	1.09	1,959	1,802	1.10	1,976
	Nov.	903	.94	849	906	.95	863
	Dec.	576	1.19	685	576	1.21	697
	Total	17,856	.70	12,481	17,320	.73	12,640
	Jan.	407	1.34	545	391	1.40	546
	Feb.	396	1.28	507	380	1.34	508
	March	630	1.16	731	608	1.20	731
	April	2,844	.55	1,564	2,826	.55	1,565
	May	3,209	.46	1,476	3,105	.48	1,485
	June	4,202	.29	1,219	4,019	.31	1,235
1942	July	1,317	.57	751	1,190	.65	777
	Aug.	454	1.08	490	379	1.36	516
	Sept.	275	1.59	438	234	1.96	459
	Oct.	334	1.58	528	334	1.62	542
	Nov.	368	1.58	582	365	1.63	595
	Dec.	357	1.54	550	353	1.59	561
	Total	14,793	.63	9,381	14,184	.67	9,520
	Jan.	330	1.50	494	318	1.56	495
	Feb.	332	1.41	469	320	1.47	470
	March	516	1.19	614	500	1.23	614
	April	1,450	.67	971	1,435	.68	971
	May	2,158	.43	928	2,072	.45	934
	June	2,729	.40	1,092	2,578	.43	1,104
1943	July	1,429	.47	672	1,327	.52	693
	Aug.	793	1.09	864	733	1.21	885
	Sept.	448	1.15	514	415	1.28	530
	Oct.	378	1.60	604	378	1.63	616
	Nov.	456	1.35	616	454	1.38	626
	Dec.	395	1.36	537	393	1.39	546
	Total	11,414	.73	8,375	10,923	.78	8,484
	Jan.	278	1.50	418	268	1.57	420
	Feb.	344	1.32	454	333	1.37	455
	March	509	1.31	668	494	1.35	668
	April	1,027	.89	914	1,013	.90	915
	May	3,251	.47	1,528	3,159	.49	1,537
	June	4,136	.32	1,323	3,986	.34	1,341
1944	July	1,782	.45	802	1,679	.49	829
	Aug.	417	1.07	446	353	1.34	473
	Sept.	229	1.50	343	193	1.89	365
	Oct.	342	1.66	567	348	1.67	582
	Nov.	384	1.51	579	387	1.53	592
	Dec.	320	1.51	483	321	1.54	494
	Total	13,019	.66	8,525	12,534	.69	8,671
	Jan.	325	1.48	481	313	1.54	482
	Feb.	351	1.39	489	339	1.44	490
	March	437	1.28	559	421	1.33	559
	April	755	.99	748	741	1.01	748
	May	2,805	.44	1,234	2,720	.46	1,240
	June	2,761	.37	1,021	2,615	.39	1,034
1945	July	1,668	.47	784	1,568	.51	806
	Aug.	1,011	.89	900	951	.97	921
	Sept.	370	1.28	474	337	1.45	490
	Oct.	505	1.51	763	505	1.54	776
	Nov.	443	1.34	594	442	1.37	604
	Dec.	337	1.35	454	335	1.38	463
	Total	11,768	.72	8,501	11,287	.76	8,613
	Jan.	366	1.28	468	357	1.31	469
	Feb.	319	1.24	396	310	1.28	397
	March	496	1.15	570	483	1.18	570
	April	1,013	.83	841	1,002	.84	841
	May	1,732	.47	814	1,653	.50	821
	June	1,993	.43	857	1,864	.47	872
1946	July	730	.73	533	639	.87	555
	Aug.	478	1.28	612	425	1.49	635
	Sept.	310	1.62	502	282	1.84	519
	Oct.	403	1.50	604	407	1.51	617
	Nov.	466	1.30	607	469	1.31	617
	Dec.	445	1.22	542	446	1.24	552
	Total	8,751	.84	7,346	8,337	.89	7,465
	Jan.	277	1.40	388	260	1.50	389
	Feb.	357	1.29	462	340	1.36	463
	March	654	1.09	713	631	1.13	713
	April	780	.78	608	759	.80	608
	May	3,121	.39	1,217	3,017	.40	1,221
	June	3,275	.40	1,310	3,087	.43	1,321
1947	July	1,926	.43	[illegible]	1,796	.47	846
	Aug.	1,203	.98	1,179	1,128	1.06	1,198
	Sept.	584	1.13	660	547	1.23	676
	Oct.	818	1.17	958	814	1.19	969
	Nov.	585	1.07	626	578	1.10	635
	Dec.	466	1.21	564	459	1.25	573
	Total	14,046	.68	9,513	13,416	.72	9,612
	Jan.	406	1.18	479	394	1.22	480
	Feb.	458	1.14	522	446	1.17	522
	March	645	1.14	735	628	1.17	735
	April	1,703	.64	1,090	1,688	.65	1,090
	May	3,507	.38	1,333	3,436	.39	1,337
	June	3,339	.34	1,135	3,211	.35	1,141
1948	July	980	.65	637	891	.73	649
	Aug.	531	1.23	653	479	1.39	666
	Sept.	230	1.40	322	203	1.64	333
	Oct.	331	1.65	545	326	1.70	553
	Nov.	408	1.46	595	400	1.50	602
	Dec.	347	1.40	485	339	1.44	490
	Total	12,885	.66	8,531	12,441	.69	8,598
	Jan.	337	1.39	469	320	1.46	468
	Feb.	361	1.25	451	344	1.31	450
	March	706	1.18	834	686	1.21	834
	April	1,307	.78	1,020	1,288	.79	1,020
	May	3,098	.43	1,332	3,014	.44	1,333
	June	4,419	.41	1,812	4,260	.42	1,813
1949	July	2,137	.52	1,111	2,028	.55	1,118
	Aug.	576	1.00	576	521	1.12	585
	Sept.	313	1.51	473	285	1.68	480
	Oct.	509	1.48	753	501	1.51	757
	Nov.	473	1.31	619	464	1.34	623
	Dec.	368	1.37	504	357	1.42	508
	Total	14,604	.68	9,954	14,068	.71	9,989
	Jan.	350	1.41	493	347	1.42	494
	Feb.	398	1.23	490	394	1.24	490
	March	650	1.11	721	646	1.12	722
	April	1,217	.74	900	1,210	.74	901
	May	1,971	.49	966	1,916	.51	968
	June	2,979	.37	1,102	2,896	.38	1,111
1950	July	1,377	.67	923	1,320	.71	935
	Aug.	422	1.02	430	392	1.12	440
	Sept.	330	1.47	485	315	1.57	495
	Oct.	342	1.47	502	349	1.46	509
	Nov.	350	1.55	542	354	1.55	548
	Dec.	415	1.31	544	420	1.31	549
	Total	10,801	.75	8,098	10,559	.77	8,162
	Jan.	315	1.43	451	311	1.45	452
	Feb.	361	1.25	451	356	1.27	451
	March	417	1.19	497	410	1.21	498
	April	531	1.00	531	523	1.02	532
	May	1,645	.57	938	1,593	.59	940
	June	2,886	.41	1,184	2,804	.42	1,191
1951	July	1,357	.48	651	1,304	.51	662
	Aug.	787	1.11	874	756	1.17	885
	Sept.	411	1.32	542	397	1.39	552
	Oct.	412	1.47	606	416	1.47	613
	Nov.	445	1.41	628	447	1.42	634
	Dec.	333	1.44	480	335	1.45	486
	Total	9,900	.79	7,833	9,652	.82	7,896
	Jan.	476	1.23	586	467	1.25	586
	Feb.	379	1.26	478	370	1.29	478
	March	440	1.31	576	430	1.34	575
	April	2,267	.74	1,677	2,254	.74	1,678
	May	5,081	.41	2,083	5,019	.41	2,084
	June	5,192	.36	1,869	5,089	.37	1,874
1952	July	1,573	.55	865	1,510	.58	875
	Aug.	821	1.06	870	787	1.12	880
	Sept.	542	1.31	710	526	1.37	719
	Oct.	369	1.43	527	364	1.46	532
	Nov.	386	1.55	599	381	1.58	604
	Dec.	378	1.47	556	373	1.50	560
	Total	17,904	.64	11,396	17,570	.65	11,445

Table 12
Colorado River Basin
Flow and Quality of Water Data
Colorado River at Lees Ferry, Arizona

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1953	Jan.	394	1.36	536	390	1.37	536
	Feb.	365	1.30	475	361	1.31	475
	March	458	1.22	558	454	1.23	559
	April	529	1.07	566	525	1.08	567
	May	1,047	.69	723	1,010	.72	725
	June	2,992	.38	1,137	2,934	.39	1,142
	July	950	.64	608	912	.68	617
	Aug.	661	1.19	787	642	1.24	797
	Sept.	258	1.59	410	248	1.68	418
	Oct.	321	1.77	568	324	1.77	573
	Nov.	414	1.50	621	416	1.50	626
	Dec.	341	1.46	498	344	1.46	502
	Total	8,730	.86	7,487	8,558	.88	7,537
1954	Jan.	318	1.46	465	316	1.47	465
	Feb.	342	1.30	444	340	1.30	444
	March	393	1.24	487	392	1.24	488
	April	546	1.00	546	545	1.00	547
	May	1,277	.56	715	1,255	.57	718
	June	792	.63	499	757	.67	506
	July	647	.87	563	621	.92	574
	Aug.	321	1.19	382	307	1.28	392
	Sept.	389	1.66	645	385	1.70	653
	Oct.	512	1.43	733	519	1.42	738
	Nov.	349	1.39	485	354	1.38	490
	Dec.	278	1.51	421	282	1.51	426
	Total	6,164	1.04	6,385	6,071	1.06	6,441
1955	Jan.	244	1.58	386	242	1.59	386
	Feb.	243	1.39	338	241	1.40	338
	March	580	1.29	748	578	1.29	748
	April	617	1.05	649	615	1.05	649
	May	1,570	.56	879	1,551	.57	882
	June	1,586	.49	777	1,551	.50	781
	July	571	.70	399	548	.74	406
	Aug.	510	1.40	713	498	1.45	721
	Sept.	230	1.60	368	223	1.67	373
	Oct.	214	1.70	363	219	1.67	367
	Nov.	275	1.67	458	280	1.65	461
	Dec.	326	1.44	470	327	1.44	472
	Total	6,966	.94	6,548	6,873	.96	6,584
1956	Jan.	373	1.28	477	371	1.28	477
	Feb.	280	1.39	390	278	1.40	390
	March	511	1.16	592	509	1.16	592
	April	898	.75	673	896	.75	673
	May	2,190	.48	1,051	2,166	.48	1,052
	June	2,594	.39	1,012	2,546	.40	1,015
	July	557	.75	418	538	.79	424
	Aug.	356	1.33	473	347	1.38	478
	Sept.	166	1.48	246	163	1.52	248
	Oct.	187	1.74	325	193	1.69	326
	Nov.	300	1.58	474	304	1.56	475
	Dec.	247	1.55	383	250	1.54	384
	Total	8,659	.75	6,514	8,561	.76	6,534
1957	Jan.	284	1.46	415	283	1.47	416
	Feb.	323	1.34	433	321	1.35	433
	March	499	1.23	613	498	1.23	614
	April	828	.90	745	827	.90	746
	May	2,569	.56	1,439	2,548	.57	1,442
	June	5,645	.39	2,201	5,614	.39	2,209
	July	4,015	.43	1,727	3,989	.44	1,738
	Aug.	1,604	.78	1,251	1,587	.79	1,261
	Sept.	822	1.03	847	814	1.05	855
	Oct.	748	1.54	1,152	755	1.53	1,156
	Nov.	848	1.39	1,179	853	1.39	1,184
	Dec.	517	1.25	646	521	1.25	651
	Total	18,702	.68	12,646	18,610	.68	12,705
1958	Jan.	397	1.27	504	396	1.27	504
	Feb.	536	1.18	632	535	1.18	632
	March	696	1.10	766	694	1.10	766
	April	1,574	.64	1,007	1,573	.64	1,007
	May	3,992	.46	1,836	3,977	.46	1,838
	June	3,678	.40	1,471	3,558	.40	1,477
	July	628	.74	465	612	.77	474
	Aug.	286	1.43	409	276	1.51	417
	Sept.	320	1.69	540	316	1.73	546
	Oct.	311	1.62	505	315	1.62	509
	Nov.	357	1.65	589	360	1.64	592
	Dec.	366	1.52	556	368	1.52	558
	Total	13,141	.71	9,280	13,080	.71	9,320

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1959	Jan.	315	1.48	[illegible]		Same as Historical	
	Feb.	315	1.36	[illegible]			
	March	344	1.37	[illegible]			
	April	420	1.18	[illegible]			
	May	1,025	.70	[illegible]			
	June	1,836	.48	[illegible]			
	July	758	.63	[illegible]			
	Aug.	485	1.43	[illegible]			
	Sept.	246	1.68	[illegible]			
	Oct.	308	1.41	[illegible]			
	Nov.	409	1.21	[illegible]			
	Dec.	352	1.39	[illegible]			
	Total	7,061	.96	6,766			
1960	Jan.	305	1.54	470			
	Feb.	318	1.34	426			
	March	745	1.18	879			
	April	1,610	.62	998			
	May	1,564	.51	798			
	June	2,239	.43	963			
	July	647	.69	446			
	Aug.	208	1.38	287			
	Sept.	193	1.90	367			
	Oct.	341	1.67	569			
	Nov.	345	1.47	507			
	Dec.	275	1.39	382			
	Total	8,790	.81	7,092			
1961	Jan.	266	1.48	394			
	Feb.	331	1.34	444			
	March	362	1.34	485			
	April	567	1.02	578			
	May	1,153	.59	680			
	June	1,588	.45	715			
	July	369	.89	328			
	Aug.	337	1.65	556			
	Sept.	711	1.61	1,145			
	Oct.	725	1.01	732			
	Nov.	527	1.04	548			
	Dec.	380	1.22	464			
	Total	7,316	.97	7,069			

ANNUAL SUMMARY

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	17,856	0.70	12,481	17,320	0.73	12,640
1942	14,793	.63	9,381	14,184	.67	9,520
1943	11,414	.73	8,375	10,923	.78	8,484
1944	13,019	.66	8,525	12,534	.69	8,671
1945	11,768	.72	8,501	11,287	.76	8,613
1946	8,751	.84	7,346	8,337	.89	7,465
1947	14,046	.68	9,513	13,416	.72	9,612
1948	12,885	.66	8,531	12,441	.69	8,598
1949	14,604	.68	9,954	14,068	.71	9,989
1950	10,801	.75	8,098	10,559	.77	8,162
1951	9,900	.79	7,833	9,652	.82	7,896
1952	17,904	.64	11,396	17,570	.65	11,445
1953	8,730	.86	7,487	8,558	.88	7,537
1954	6,164	1.04	6,385	6,071	1.06	6,441
1955	6,966	.94	6,548	6,873	.96	6,584
1956	8,659	.75	6,514	8,561	.76	6,534
1957	18,702	.68	12,646	18,610	.68	12,705
1958	13,141	.71	9,280	13,080	.71	9,320
1959	7,061	.96	6,766	7,061	.96	6,766
1960	8,790	.81	7,092	8,790	.81	7,092
1961	7,316	.97	7,069	7,316	.97	7,069
Total	243,270		179,721	[illegible]		181,143
Average	11,584	0.74	8,558	[illegible]	0.76	8,626

Sampled quality record November 1942 to October 1945 and October 1947 to December 1961; remainder by correlation.

Measured flow record entire period.

Table 13

Colorado River Basin

Flow and Quality of Water Data

Colorado River near Grand Canyon, Arizona

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	434	1.42	616	423	1.46	618
	Feb.	515	1.31	675	503	1.34	676
	March	838	1.17	980	822	1.19	980
	April	1,209	.87	1,052	1,194	.88	1,053
	May	4,976	.50	2,488	4,875	.51	2,498
	June	4,100	.45	1,845	3,933	.47	1,864
1941	July	1,753	.55	964	1,639	.61	994
	Aug.	861	1.29	1,111	790	1.44	1,141
	Sept.	659	1.43	942	622	1.55	965
	Oct.	1,904	1.14	2,171	1,909	1.15	2,188
	Nov.	953	.98	934	956	.99	948
	Dec.	594	1.22	725	594	1.24	737
	Total	18,796	0.77	14,503	18,260	.80	14,662
	Jan.	430	1.40	602	414	1.46	603
	Feb.	435	1.33	579	419	1.38	580
	March	653	1.25	816	631	1.29	816
	April	2,763	.60	1,658	2,745	.60	1,659
	May	3,163	.49	1,550	3,059	.51	1,559
	June	4,241	.32	1,357	4,058	.34	1,373
1942	July	1,345	.59	794	1,218	.67	820
	Aug.	486	1.15	559	411	1.42	585
	Sept.	294	1.67	491	253	2.02	512
	Oct.	356	1.67	575	356	1.66	589
	Nov.	386	1.67	645	383	1.72	658
	Dec.	373	1/1.50	560	369	1.55	571
	Total	14,925	.68	10,186	14,316	.72	10,325
	Jan.	347	1/1.49	517	335	1.55	518
	Feb.	351	1/1.48	519	339	1.53	520
	March	580	1/1.26	731	564	1.30	731
	April	1,417	1/ .83	1,176	1,402	.84	1,176
	May	2,161	1/ .57	1,232	2,075	.60	1,238
	June	2,676	1/ .49	1,311	2,525	.52	1,323
1943	July	1,459	1/ .60	875	1,357	.66	896
	Aug.	834	1/1.17	976	774	1.29	997
	Sept.	494	1/1.40	692	461	1.54	708
	Oct.	408	1.69	690	408	1.72	702
	Nov.	477	1.47	701	475	1.50	711
	Dec.	420	1.46	613	418	1.49	622
	Total	11,624	.86	10,033	11,133	.91	10,142
	Jan.	298	1.61	480	288	1.67	482
	Feb.	363	1.23	446	352	1.27	447
	March	551	1.41	777	536	1.45	777
	April	1,099	.95	1,044	1,085	.96	1,045
	May	3,206	.55	1,763	3,114	.57	1,772
	June	4,144	.41	1,699	3,994	.43	1,717
1944	July	1,854	.52	964	1,751	.57	991
	Aug.	456	1.14	520	392	1.40	547
	Sept.	251	1.61	404	215	1.98	426
	Oct.	362	1.78	644	368	1.79	659
	Nov.	401	1.64	658	404	1.66	671
	Dec.	345	1.59	549	346	1.62	560
	Total	13,330	.75	9,948	12,845	.79	10,094
	Jan.	356	1.55	552	344	1.61	553
	Feb.	381	1.48	564	369	1.53	565
	March	472	1.41	666	456	1.46	666
	April	804	1.01	812	790	1.03	812
	May	2,803	.52	1,458	2,718	.54	1,464
	June	2,754	.48	1,322	2,608	.51	1,335
1945	July	1,732	.56	970	1,632	.61	992
	Aug.	1,071	1.05	1,125	1,011	1.13	1,146
	Sept.	394	1.38	544	361	1.55	560
	Oct.	524	1.63	854	524	1.65	867
	Nov.	465	1.51	702	464	1.53	712
	Dec.	359	1.47	528	357	1.50	537
	Total	12,115	.83	10,097	11,634	.88	10,209
	Jan.	384	1.41	541	375	1.44	542
	Feb.	333	1.38	460	324	1.42	461
	March	514	1.29	663	501	1.32	663
	April	1,016	.94	955	1,005	.95	955
	May	1,775	.53	941	1,696	.56	948
	June	1,995	.54	1,077	1,866	.59	1,092
1946	July	784	.82	643	693	.96	665
	Aug.	567	1.50	850	514	1.70	873
	Sept.	372	1.71	636	344	1.90	653
	Oct.	419	1.62	679	423	1.64	692
	Nov.	492	1.39	684	495	1.40	694
	Dec.	468	1.31	613	469	1.33	623
	Total	9,119	.96	8,742	8,705	1.02	8,861
	Jan.	303	1.50	455	286	1.59	456
	Feb.	371	1.38	512	354	1.45	513
	March	653	1.18	771	630	1.22	771
	April	785	.92	722	764	.95	722
	May	3,088	.48	1,482	2,984	.50	1,486
	June	3,233	.48	1,552	3,045	.51	1,553
1947	July	1,953	.50	976	1,823	.55	994
	Aug.	1,329	1.17	1,555	1,254	1.26	1,574
	Sept.	640	1.26	806	603	1.36	822
	Oct.	894	1.28	1,144	890	1.30	1,155
	Nov.	608	1.14	693	601	1.17	702
	Dec.	490	1.28	627	483	1.32	636
	Total	14,347	.79	11,295	13,717	.83	11,394
	Jan.	427	1.27	542	415	1.31	[illegible]
	Feb.	458	1.28	586	446	1.31	586
	March	669	1.25	836	652	1.28	836
	April	1,732	.74	1,282	1,717	.75	1,282
	May	3,392	.45	1,526	3,321	.46	1,530
	June	3,358	.40	1,343	3,230	.42	1,349
1948	July	1,009	.73	737	920	.81	749
	Aug.	587	1.33	781	535	1.48	794
	Sept.	242	1.65	399	215	1.91	410
	Oct.	336	1.82	612	331	1.87	620
	Nov.	434	1.61	699	426	1.66	706
	Dec.	365	1.25	456	357	1.29	461
	Total	13,009	.75	9,799	12,565	.79	[illegible]
	Jan.	363	1.51	548	346	1.58	547
	Feb.	374	1.36	509	357	1.42	508
	March	796	1.20	955	776	1.23	955
	April	1,337	.92	1,230	1,318	.93	1,230
	May	2,959	.48	1,420	2,875	.49	1,421
	June	4,303	.48	2,065	4,144	.50	2,066
1949	July	2,128	.58	1,234	2,019	.62	1,241
	Aug.	632	1.12	708	577	1.24	717
	Sept.	340	1.65	561	312	1.82	568
	Oct.	521	1.58	823	513	1.61	827
	Nov.	488	1.36	664	479	1.39	668
	Dec.	381	1.41	537	370	1.46	541
	Total	14,622	.77	11,254	14,086	.80	11,289
	Jan.	358	1.56	558	355	1.57	559
	Feb.	414	1.35	559	410	1.36	559
	March	670	1.21	811	666	1.22	812
	April	1,192	.88	1,049	1,185	.89	1,050
	May	1,941	.59	1,145	1,886	.61	1,147
	June	2,925	.47	1,375	2,842	.49	1,384
1950	July	1,401	.76	1,065	1,344	.80	1,077
	Aug.	444	1.13	502	414	1.24	512
	Sept.	343	1.56	535	328	1.66	545
	Oct.	359	1.67	600	366	1.66	607
	Nov.	355	1.75	621	359	1.75	627
	Dec.	434	1.48	642	439	1.47	647
	Total	10,836	.87	9,462	10,594	.90	9,526
	Jan.	326	1.59	518	322	1.61	519
	Feb.	366	1.45	531	361	1.47	531
	March	429	1.35	579	422	1.37	580
	April	535	1.17	626	527	1.19	627
	May	1,552	.67	1,040	1,500	.69	1,042
	June	2,800	.49	1,372	2,718	.51	1,379
1951	July	1,397	.57	796	1,344	.60	807
	Aug.	833	1.18	983	802	1.24	994
	Sept.	452	1.46	660	438	1.53	672
	Oct.	425	1.67	710	429	1.67	717
	Nov.	466	1.61	750	468	1.62	756
	Dec.	353	1.61	568	355	1.62	574
	Total	9,934	.92	9,133	9,686	.95	9,126
	Jan.	593	1.28	759	584	1.30	759
	Feb.	396	1.42	562	387	1.45	562
	March	435	1.46	635	425	1.49	634
	April	2,209	.84	1,855	2,196	.85	1,856
	May	5,062	.52	2,632	5,000	.53	2,633
	June	5,203	.46	2,393	5,100	.47	2,398
1952	July	1,590	.65	1,033	1,527	.68	1,043
	Aug.	833	1.18	983	799	1.24	993
	Sept.	596	1.43	852	580	1.48	861
	Oct.	393	1.52	597	388	1.55	602
	Nov.	396	1.64	649	391	1.67	654
	Dec.	400	1.58	632	395	1.61	636
	Total	18,106	.75	13,582	17,772	.77	13,63[illegible]

Table 13

Colorado River Basin

Flow and Quality of Water Data

Colorado River near Grand Canyon, Arizona

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1953	Jan.	408	1.46	596	404	1.48	596
	Feb.	378	1.42	537	374	1.44	537
	March	478	1.35	645	474	1.36	646
	April	533	1.21	645	527	1.23	646
	May	989	.87	860	952	.91	862
	June	2,932	.47	1,378	2,874	.48	1,383
	July	980	.76	745	942	.80	754
	Aug.	703	1.30	914	684	1.35	924
	Sept.	290	1.73	502	280	1.82	510
	Oct.	325	1.88	611	328	1.88	616
	Nov.	428	1.63	698	430	1.63	703
	Dec.	360	1.56	562	363	1.56	566
	Total	8,804	.99	8,693	8,632	1.01	8,743
1954	Jan.	333	1.58	526	331	1.59	526
	Feb.	353	1.40	494	351	1.41	494
	March	424	1.34	568	423	1.35	569
	April	566	1.11	628	565	1.11	629
	May	1,211	.68	823	1,189	.69	826
	June	798	.68	543	763	.72	550
	July	669	.95	636	643	1.01	647
	Aug.	349	1.32	461	335	1.41	471
	Sept.	415	1.67	693	409	1.71	701
	Oct.	526	1.52	800	533	1.51	805
	Nov.	360	1.47	529	365	1.46	534
	Dec.	296	1.60	474	300	1.60	479
	Total	6,300	1.14	7,175	6,207	1.16	7,231
1955	Jan.	261	1.70	444	259	1.71	444
	Feb.	269	1.50	404	267	1.51	404
	March	586	1.35	791	584	1.35	791
	April	621	1.15	714	619	1.15	714
	May	1,515	.59	894	1,496	.60	897
	June	1,596	.55	878	1,561	.56	882
	July	618	.77	476	595	.81	483
	Aug.	668	1.39	929	656	1.43	937
	Sept.	265	1.63	432	258	1.69	437
	Oct.	236	1.84	434	241	1.82	438
	Nov.	298	1/1.88	560	303	1.86	563
	Dec.	354	1/1.52	538	355	1.52	540
	Total	7,287	1.03	7,494	7,194	1.05	7,530
1956	Jan.	398	1/1.42	565	396	1.43	565
	Feb.	310	1.30	403	308	1.31	403
	March	511	1.21	618	509	1.21	618
	April	878	.82	720	876	.82	720
	May	2,125	.49	1,041	2,101	.50	1,042
	June	2,584	.45	1,163	2,536	.46	1,166
	July	598	.82	490	579	.86	496
	Aug.	383	1.31	502	374	1.36	507
	Sept.	185	1.58	292	182	1.62	294
	Oct.	202	1.86	376	208	1.81	377
	Nov.	325	1.69	549	329	1.67	550
	Dec.	274	1.66	455	277	1.65	456
	Total	8,773	.82	7,174	8,675	.83	7,194
1957	Jan.	343	1.45	497	342	1.46	498
	Feb.	370	1.37	507	368	1.38	507
	March	541	1.26	682	540	1.26	683
	April	812	.93	755	811	.93	756
	May	2,501	.57	1,426	2,480	.58	1,429
	June	5,541	.40	2,216	5,510	.40	2,224
	July	4,033	.40	1,613	4,007	.41	1,624
	Aug.	1,672	.88	1,471	1,655	.89	1,481
	Sept.	884	1.13	999	876	1.14	1,007
	Oct.	784	1.46	1,144	791	1.45	1,150
	Nov.	892	1.42	1,266	897	1.41	1,271
	Dec.	537	1.28	687	541	1.28	692
	Total	18,910	.70	13,263	18,818	.71	13,322
1958	Jan.	415	1.31	544	414	1.31	544
	Feb.	536	1.24	665	535	1.24	665
	March	749	1.13	846	747	1.13	846
	April	1,580	.77	1,220	1,579	.77	1,220
	May	3,900	.45	1,755	3,885	.45	1,757
	June	3,763	.41	1,542	3,743	.41	1,548
	July	683	.91	622	667	.95	631
	Aug.	337	1/1.31	440	327	1.37	448
	Sept.	379	1/1.32	500	375	1.35	506
	Oct.	346	1/1.53	530	350	1.53	534
	Nov.	385	1/1.53	590	388	1.54	593
	Dec.	388	1/1.55	600	390	1.54	602
	Total	13,461	.73	9,854	13,400	.74	9,894

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1959	Jan.	334	1/1.56	520	Same as historical		
	Feb.	326	1/1.53	500			
	March	365	1/1.53	560			
	April	423	1.27	537			
	May	1,011	.78	789			
	June	1,804	.53	[illegible]			
	July	795	.89	[illegible]			
	Aug.	488	1.50	[illegible]			
	Sept.	271	1.82	[illegible]			
	Oct.	528	1.47	777			
	Nov.	569	1.25	712			
	Dec.	394	1.33	524			
	Total	7,308	1.05	7,648			
1960	Jan.	348	1.41	490			
	Feb.	353	1.40	495			
	March	820	1.15	942			
	April	1,650	.63	1,036			
	May	1,580	.55	870			
	June	2,212	.46	1,011			
	July	678	.73	497			
	Aug.	233	1.42	331			
	Sept.	218	1.92	418			
	Oct.	382	1.81	692			
	Nov.	380	1.59	603			
	Dec.	300	1.49	448			
	Total	9,154	.86	7,833			
1961	Jan.	291	1.58	460			
	Feb.	353	1.39	490			
	March	379	1.40	530			
	April	587	1.04	608			
	May	1,147	.66	760			
	June	1,692	.47	788			
	July	417	.98	409			
	Aug.	374	1.76	658			
	Sept.	748	1.82	1,360			
	Oct.	772	1.23	949			
	Nov.	570	1.23	701			
	Dec.	409	1.32	539			
	Total	7,739	1.07	8,252			

1/ Correlated.

ANNUAL SUMMARY

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	18,796	0.77	14,503	18,260	0.80	14,662
1942	14,925	.68	10,186	14,316	.72	10,325
1943	11,624	.86	10,033	11,133	.91	10,142
1944	13,330	.75	9,948	12,845	.79	10,094
1945	12,115	.83	10,097	11,634	.88	10,203
1946	9,119	.96	8,742	8,705	1.02	8,861
1947	14,347	.79	11,295	13,717	.83	11,394
1948	13,009	.75	9,799	12,565	.79	9,866
1949	14,622	.77	11,254	14,086	.80	11,289
1950	10,836	.87	9,462	10,594	.90	9,526
1951	9,934	.92	9,133	9,686	.95	9,195
1952	18,106	.75	13,582	17,772	.77	13,631
1953	8,804	.99	8,693	8,632	1.01	8,743
1954	6,300	1.14	7,175	6,207	1.16	7,231
1955	7,287	1.03	7,494	7,194	1.05	7,530
1956	8,773	.82	7,174	8,675	.83	7,194
1957	18,910	.70	13,263	18,818	.71	13,322
1958	13,461	.73	9,854	13,400	.74	9,894
1959	7,308	1.05	7,648	7,308	1.05	7,649
1960	9,154	.86	7,833	9,154	.86	7,933
1961	7,739	1.07	8,252	7,739	1.07	8,252
Total	248,499		205,420	242,440		206,842
Average	11,833	0.83	9,782	11,545	0.85	9,850

Table 14

Colorado River Basin

Flow and Quality of Water Data

Virgin River at Littlefield, Arizona

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	Jan.	15	2.39	35	Same as historical		
	Feb.	31	1.97	61			
	March	62	.82	51			
	April	62	.84	52			
	May	131	.46	60			
	June	19	1.75	34			
	July	22	2.45	54			
	Aug.	20	3.02	62			
	Sept.	6	3.29	18			
	Oct.	23	3.22	74			
	Nov.	19	2.26	43			
	Dec.	17	2.28	39			
	Total	427	1.37	583			
1942	Jan.	20	2.25	44			
	Feb.	16	2.28	35			
	March	20	1.88	38			
	April	50	1.01	51			
	May	28	1.56	44			
	June	5	3.15	16			
	July	4	3.31	14			
	Aug.	9	3.29	29			
	Sept.	4	3.31	13			
	Oct.	9	3.41	31			
	Nov.	10	2.78	29			
	Dec.	11	2.72	31			
	Total	186	2.01	375			
1943	Jan.	18	2.32	42			
	Feb.	21	2.14	45			
	March	36	1.28	47			
	April	34	1.36	46			
	May	11	2.27	26			
	June	4	3.35	13			
	July	4	3.31	14			
	Aug.	13	3.35	42			
	Sept.	6	3.46	20			
	Oct.	9	3.40	30			
	Nov.	10	2.79	28			
	Dec.	13	2.51	32			
	Total	179	2.15	385			
1944	Jan.	13	2.47	33			
	Feb.	15	2.31	35			
	March	26	1.64	42			
	April	25	1.66	42			
	May	49	1.05	51			
	June	11	2.32	25			
	July	4	3.32	13			
	Aug.	4	3.31	13			
	Sept.	4	3.31	14			
	Oct.	5	3.30	16			
	Nov.	13	2.48	32			
	Dec.	12	2.65	31			
	Total	181	1.92	347			
1945	Jan.	11	2.68	30			
	Feb.	17	2.15	38			
	March	20	1.87	38			
	April	20	1.83	36			
	May	25	1.55	39			
	June	5	3.22	15			
	July	5	3.31	15			
	Aug.	26	3.06	79			
	Sept.	8	3.19	25			
	Oct.	20	3.14	62			
	Nov.	10	2.75	29			
	Dec.	14	2.47	35			
	Total	181	2.43	441			
1946	Jan.	13	2.48	32			
	Feb.	10	2.74	27			
	March	10	2.63	28			
	April	12	2.49	29			
	May	5	3.31	15			
	June	4	3.32	13			
	July	6	3.40	21			
	Aug.	13	3.17	42			
	Sept.	4	3.31	13			
	Oct.	37	2.18	81			
	Nov.	33	1.85	61			
	Dec.	22	2.12	47			
	Total	169	2.42	409			
1947	Jan.	15	2.34	35	Same as historical		
	Feb.	12	2.46	30			
	March	13	2.32	31			
	April	16	2.17	34			
	May	17	1.98	33			
	June	4	[illegible]	[illegible]			
	July	5	[illegible]	16			
	Aug.	14	2.97	41			
	Sept.	4	[illegible]	[illegible]			
	Oct.	8	[illegible]	27			
	Nov.	9	[illegible]	27			
	Dec.	14	2.46	34			
	Total	131	2.56	336			
1948	Jan.	11	2.78	29			
	Feb.	12	2.47	30			
	March	13	2.42	31			
	April	20	1.87	37			
	May	10	2.47	25			
	June	4	3.32	14			
	July	4	3.31	14			
	Aug.	5	3.31	18			
	Sept.	6	3.39	20			
	Oct.	6	3.34	20			
	Nov.	10	2.87	27			
	Dec.	10	2.85	29			
	Total	111	2.65	294			
1949	Jan.	13	2.52	32			
	Feb.	14	2.42	35			
	March	18	2.07	36			
	April	30	1.43	44			
	May	28	1.53	43			
	June	12	2.11	25			
	July	4	3.19	14			
	Aug.	4	3.20	13			
	Sept.	7	3.27	23			
	Oct.	9	3.07	26			
	Nov.	11	2.68	29			
	Dec.	13	2.51	34			
	Total	163	2.17	354			
1950	Jan.	15	2.20	33			
	Feb.	16	2.00	32			
	March	14	2.26	31			
	April	15	2.05	31			
	May	6	2.87	19			
	June	4	3.28	13			
	July	12	3.38	40			
	Aug.	6	3.43	19			
	Sept.	6	3.35	20			
	Oct.	5	3.40	17			
	Nov.	9	3.14	28			
	Dec.	10	2.91	30			
	Total	118	2.65	313			
1951	Jan.	11	2.77	30			
	Feb.	8	2.84	22			
	March	8	2.83	23			
	April	7	3.17	22			
	May	10	2.74	27			
	June	4	3.37	12			
	July	6	3.34	20			
	Aug.	16	3.27	55			
	Sept.	6	3.20	20			
	Oct.	7	3.24	22			
	Nov.	9	2.94	26			
	Dec.	20	2.42	49			
	Total	112	2.93	328			
1952	Jan.	21	2.34	49			
	Feb.	11	2.52	28			
	March	27	1.74	48			
	April	80	.76	60			
	May	71	.68	49			
	June	12	1.75	21			
	July	4	3.27	14			
	Aug.	5	3.43	18			
	Sept.	6	3.34	20			
	Oct.	6	3.40	20			
	Nov.	10	2.84	29			
	Dec.	14	2.53	34			
	Total	267	1.46	[illegible]			

Table 14
Colorado River Basin
Flow and Quality of Water Data
Virgin River at Littlefield, Arizona

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	14	2.36	32	Same as historical		
	Feb.	9	2.70	24			
	March	7	2.98	21			
	April	6	3.27	20			
	May	5	3.27	16			
	June	4	3.34	14			
1953	July	8	3.46	28			
	Aug.	13	3.04	40			
	Sept.	4	3.38	13			
	Oct.	7	3.31	24			
	Nov.	10	3.07	29			
	Dec.	11	2.83	31			
	Total	98	3.00	292			
	Jan.	15	2.49	37			
	Feb.	12	2.36	29			
	March	17	1.98	33			
	April	23	1.64	38			
	May	10	2.35	23			
	June	5	3.36	18			
1954	July	8	3.42	26			
	Aug.	10	3.44	34			
	Sept.	9	3.56	32			
	Oct.	9	3.48	30			
	Nov.	9	3.13	29			
	Dec.	13	2.71	36			
	Total	140	2.61	365			
	Jan.	12	2.60	31			
	Feb.	12	2.51	30			
	March	11	2.53	27			
	April	6	3.14	19			
	May	5	3.18	16			
	June	4	3.39	13			
1955	July	10	3.61	37			
	Aug.	40	3.69	149			
	Sept.	5	3.26	15			
	Oct.	5	3.51	19			
	Nov.	10	3.05	31			
	Dec.	13	2.60	34			
	Total	133	3.16	421			
	Jan.	15	2.53	38			
	Feb.	11	2.59	29			
	March	8	2.87	22			
	April	6	3.13	18			
	May	4	3.23	15			
	June	4	3.34	15			
1956	July	8	3.53	27			
	Aug.	4	3.35	13			
	Sept.	4	3.35	12			
	Oct.	4	3.39	14			
	Nov.	6	3.50	21			
	Dec.	8	3.29	25			
	Total	82	3.05	249			
	Jan.	12	2.77	33			
	Feb.	14	2.32	32			
	March	10	2.64	26			
	April	6	2.99	18			
	May	15	2.04	31			
	June	9	2.85	25			
1957	July	4	3.31	13			
	Aug.	9	3.41	31			
	Sept.	4	3.27	12			
	Oct.	14	3.02	44			
	Nov.	21	2.45	51			
	Dec.	15	2.04	31			
	Total	133	2.61	347			
	Jan.	10	2.49	24			
	Feb.	19	1.83	35			
	March	41	1.43	59			
	April	64	1.02	65			
	May	69	1.05	73			
	June	7	2.29	16			
1958	July	6	3.17	19			
	Aug.	5	3.22	18			
	Sept.	22	3.13	70			
	Oct.	8	3.16	24			
	Nov.	11	2.62	28			
	Dec.	10	2.67	26			
	Total	272	1.68	457			
	Jan.	10	2.58	27	Same as historical		
	Feb.	13	2.30	31			
	March	9	2.67	24			
	April	4	3.05	13			
	May	4	3.07	13			
	June	4	3.24	[illegible]			
1959	July	4	3.32	[illegible]			
	Aug.	12	3.35	[illegible]			
	Sept.	4	3.80	[illegible]			
	Oct.	5	3.30	[illegible]			
	Nov.	13	2.90	36			
	Dec.	9	2.60	23			
	Total	91	2.87	260			
	Jan.	11	2.48	28			
	Feb.	10	[illegible]	24			
	March	10	[illegible]	24			
	April	[illegible]	[illegible]	17			
	May	[illegible]	[illegible]	14			
	June	[illegible]	[illegible]	10			
1960	July	4	[illegible]	12			
	Aug.	3	[illegible]	11			
	Sept.	6	3.51	20			
	Oct.	6	3.05	19			
	Nov.	12	2.80	35			
	Dec.	8	2.71	22			
	Total	84	2.79	236			
	Jan.	8	2.76	21			
	Feb.	7	2.80	20			
	March	8	2.84	23			
	April	4	3.11	14			
	May	4	3.14	12			
	June	4	3.14	12			
1961	July	8	3.22	27			
	Aug.	17	3.58	60			
	Sept.	22	3.36	73			
	Oct.	5	3.41	19			
	Nov.	8	3.07	23			
	Dec.	13	2.69	34			
	Total	108	3.14	338			

ANNUAL SUMMARY

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	427	1.37	583	Same as historical		
1942	186	2.01	375			
1943	179	2.15	385			
1944	181	1.92	347			
1945	181	2.43	441			
1946	169	2.42	409			
1947	131	2.56	336			
1948	111	2.65	294			
1949	163	2.17	354			
1950	118	2.65	313			
1951	112	2.93	328			
1952	267	1.46	390			
1953	98	3.00	292			
1954	140	2.61	365			
1955	133	3.16	421			
1956	82	3.05	249			
1957	133	2.61	347			
1958	272	1.68	457			
1959	91	2.87	260			
1960	84	2.79	236			
1961	108	3.14	338			
Total	3,366		7,520			
Average	160	2.24	358			

Table 15

Colorado River Basin

Flow and Quality of Water Data

Colorado River below Hoover Dam, Arizona, Nevada

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	Jan.	589	1.08	636			
	Feb.	500	1.11	555			
	March	552	1.10	607			
	April	518	1.08	560			
	May	1,435	1.08	1,550			
	June	1,810	1.07	1,935			
	July	951	1.06	1,007			
	Aug.	1,429	.97	1,386			
	Sept.	1,576	.94	1,481			
	Oct.	1,641	.94	1,543			
	Nov.	1,817	.93	1,690			
	Dec.	2,071	.94	1,947			
	Total	14,889	1.00	14,897	14,353	1.05	15,056
1942	Jan.	2,011	1.00	2,011			
	Feb.	1,550	.99	1,535			
	March	1,425	1.00	1,425			
	April	1,301	1.00	1,301			
	May	1,343	1.00	1,343			
	June	1,561	1.01	1,577			
	July	1,285	.99	1,272			
	Aug.	846	.99	838			
	Sept.	1,025	.98	1,005			
	Oct.	1,163	.95	1,105			
	Nov.	1,095	.90	986			
	Dec.	1,157	.85	983			
	Total	15,762	.98	15,381	15,153	1.02	15,520
1943	Jan.	1,109	.87	965			
	Feb.	823	.89	732			
	March	971	.94	913			
	April	915	.95	869			
	May	1,029	.94	967			
	June	1,040	.93	967			
	July	1,109	.91	1,009			
	Aug.	1,042	.92	959			
	Sept.	1,042	.91	948			
	Oct.	1,179	.90	1,061			
	Nov.	1,179	.86	1,014			
	Dec.	1,277	.86	1,098			
	Total	12,715	.90	11,502	12,224	.95	11,611
1944	Jan.	1,303	.88	1,147			
	Feb.	1,269	.97	1,231			
	March	1,307	.96	1,254			
	April	1,170	.97	1,135			
	May	1,216	.98	1,192			
	June	1,097	.95	1,042			
	July	1,111	.93	1,033			
	Aug.	1,211	.92	1,113			
	Sept.	1,132	.89	1,007			
	Oct.	1,226	1/.94	1,152			
	Nov.	1,186	1/.99	1,174			
	Dec.	1,199	.94	1,127			
	Total	14,427	.94	13,607	13,942	.99	13,753
1945	Jan.	1,239	.93	1,152			
	Feb.	1,100	1/.96	1,056			
	March	1,250	2/.96	1,200			
	April	1,042	1/.95	990			
	May	1,068	1/.90	961			
	June	1,014	2/.91	923			
	July	861	.92	792			
	Aug.	885	1/.93	823			
	Sept.	869	1/.90	782			
	Oct.	1,080	1/.88	950			
	Nov.	1,042	1/.90	938			
	Dec.	1,062	1/.89	945			
	Total	12,512	.92	11,512	12,031	.97	11,624
1946	Jan.	1,116	.87	971			
	Feb.	1,047	1/.95	994			
	March	1,004	.88	884			
	April	892	.89	794			
	May	903	1/.96	867			
	June	817	1/.92	752			
	July	838	.90	754			
	Aug.	751	1/.91	683			
	Sept.	759	2/.91	691			
	Oct.	857	1/.92	788			
	Nov.	762	2/.91	693			
	Dec.	859	1/.90	773			
	Total	10,605	.91	9,644	10,191	.96	9,763
1947	Jan.	984	0.90	886			
	Feb.	886	.91	806			
	March	956	.92	879			
	April	859	1/.99	850			
	May	951	1/1.03	979			
	June	919	1/.95	873			
	July	925	.96	[illegible]			
	Aug.	865	[illegible]	[illegible]			
	Sept.	845	[illegible]	[illegible]			
	Oct.	828	[illegible]	[illegible]			
	Nov.	880	[illegible]	[illegible]			
	Dec.	1,063	[illegible]	[illegible]			
	Total	10,959	.94	[illegible]	[illegible]	1.01	10,382
1948	Jan.	1,169	2/.93	[illegible]			
	Feb.	1,138	1/.95	[illegible]			
	March	1,150	1/.93	1,070			
	April	1,202	1/.97	1,166			
	May	1,142	1/.93	1,062			
	June	1,076	1/.88	947			
	July	1,156	1/.86	994			
	Aug.	968	1/.86	833			
	Sept.	981	1/.85	834			
	Oct.	917	1/.80	734			
	Nov.	1,028	.88	905			
	Dec.	1,124	1/.91	1,023			
	Total	13,051	.90	11,713	12,607	.93	11,730
1949	Jan.	1,212	.83	1,006			
	Feb.	1,214	1/.84	1,020			
	March	1,291	1/.85	1,097			
	April	1,178	1/.86	1,013			
	May	1,026	1/.83	852			
	June	986	.87	858			
	July	1,020	.84	857			
	Aug.	1,062	.80	850			
	Sept.	1,141	.78	890			
	Oct.	1,176	.75	882			
	Nov.	1,022	1/.83	848			
	Dec.	1,238	.87	1,077			
	Total	13,566	.83	11,250	13,030	.87	11,285
1950	Jan.	1,277	.83	1,060			
	Feb.	1,132	.81	917			
	March	1,246	.85	1,059			
	April	1,089	.85	926			
	May	1,120	1/.84	941			
	June	960	1/.83	797			
	July	982	.79	776			
	Aug.	872	1/.82	715			
	Sept.	824	1/.79	651			
	Oct.	848	.89	755			
	Nov.	815	.88	717			
	Dec.	851	.86	732			
	Total	12,016	.84	10,046	11,774	.86	10,110
1951	Jan.	928	.87	807			
	Feb.	756	.87	658			
	March	860	.91	783			
	April	796	.93	740			
	May	898	.92	826			
	June	691	.91	629			
	July	783	.92	720			
	Aug.	907	.93	844			
	Sept.	848	.92	780			
	Oct.	756	.93	703			
	Nov.	818	.93	761			
	Dec.	829	.91	754			
	Total	9,870	.91	9,005	9,622	.94	9,068
1952	Jan.	1,070	.90	963			
	Feb.	1,212	.93	1,127			
	March	1,371	.94	1,289			
	April	1,385	.94	1,302			
	May	1,532	.94	1,440			
	June	1,432	.91	1,303			
	July	1,304	.83	1,082			
	Aug.	1,307	.79	1,033			
	Sept.	1,359	.73	992			
	Oct.	1,291	.69	891			
	Nov.	1,215	.66	808			
	Dec.	1,338	.88	1,177			
	Total	15,815	.85	13,401	15,482	.87	13,450

Table 15

Colorado River Basin

Flow and Quality of Water Data

Colorado River below Hoover Dam, Arizona, Nevada

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1953	Jan.	1,227	0.93	1,141			
	Feb.	1,043	.91	949			
	March	1,046	.93	973			
	April	971	.94	913			
	May	998	.91	908			
	June	819	.89	729			
	July	897	.87	780			
	Aug.	968	.87	842			
	Sept.	968	.86	832			
	Oct.	802	.86	690			
	Nov.	749	.86	644			
	Dec.	814	.85	692			
	Total	11,302	.89	10,093	11,130	.91	10,143
1954	Jan.	836	.88	736			
	Feb.	721	.94	678			
	March	911	.95	865			
	April	975	.94	916			
	May	1,101	.93	1,024			
	June	929	.94	873			
	July	1,027	.94	965			
	Aug.	888	.97	861			
	Sept.	933	.97	905			
	Oct.	776	.94	729			
	Nov.	676	.95	642			
	Dec.	741	.97	719			
	Total	10,514	.94	9,915	10,421	.96	9,969
1955	Jan.	725	.99	718			
	Feb.	705	1.04	733			
	March	906	1.08	978			
	April	882	1.11	979			
	May	926	1.12	1,039			
	June	680	1.12	762			
	July	847	1.11	940			
	Aug.	789	1.12	884			
	Sept.	622	1.11	690			
	Oct.	526	1.12	589			
	Nov.	487	1.12	545			
	Dec.	492	1.09	536			
	Total	8,589	1.09	9,393	8,496	1.11	9,429
1956	Jan.	583	1.09	635			
	Feb.	499	1.10	549			
	March	769	1.12	861			
	April	840	1.14	958			
	May	748	1.15	860			
	June	784	1.17	917			
	July	782	1.19	931			
	Aug.	696	1.17	814			
	Sept.	610	1.15	702			
	Oct.	490	1.16	568			
	Nov.	554	1.12	620			
	Dec.	457	1.10	503			
	Total	7,812	1.14	8,918	7,714	1.16	8,938
1957	Jan.	534	1.07	571			
	Feb.	470	1.08	508			
	March	739	1.11	820			
	April	890	1.09	970			
	May	769	1.07	823			
	June	828	1.06	878			
	July	786	1.05	825			
	Aug.	786	1.03	810			
	Sept.	785	1.02	801			
	Oct.	697	1.02	711			
	Nov.	958	.99	948			
	Dec.	1,081	.94	1,016			
	Total	9,323	1.04	9,681	9,231	1.06	9,740
1958	Jan.	1,245	.90	1,120			
	Feb.	846	.94	795			
	March	1,435	.90	1,292			
	April	1,473	.88	1,296			
	May	1,115	.84	937			
	June	819	.85	696			
	July	894	.85	760			
	Aug.	911	.83	756			
	Sept.	792	.83	657			
	Oct.	728	.82	597			
	Nov.	746	.82	612			
	Dec.	873	.85	785			
	Total	11,877	.86	10,243	11,816	.87	10,283
1959	Jan.	795	0.85	676	Same as historical		
	Feb.	648	.83	537			
	March	827	.88	728			
	April	916	.91	83[illegible]			
	May	949	.86	816			
	June	760	.85	[illegible]			
	July	848	.84	[illegible]			
	Aug.	894	.83	[illegible]			
	Sept.	773	.81	[illegible]			
	Oct.	693	.8[illegible]	[illegible]			
	Nov.	607	.81	[illegible]			
	Dec.	372	.81	[illegible]			
	Total	9,282	.84	7,[illegible]			
1960	Jan.	629	.86	541			
	Feb.	512	.89	456			
	March	710	.89	632			
	April	909	.93	845			
	May	856	.93	796			
	June	1,015	.92	934			
	July	984	.89	876			
	Aug.	959	.93	892			
	Sept.	806	.93	749			
	Oct.	556	.92	512			
	Nov.	489	.92	450			
	Dec.	572	.92	526			
	Total	8,997	.91	8,209			
1961	Jan.	591	.93	549			
	Feb.	577	.94	543			
	March	936	.95	889			
	April	904	.97	877			
	May	943	.95	896			
	June	842	.94	791			
	July	822	.94	772			
	Aug.	739	.96	709			
	Sept.	690	.96	663			
	Oct.	539	.93	502			
	Nov.	517	.94	486			
	Dec.	486	.95	462			
	Total	8,586	.95	8,139			

ANNUAL SUMMARY

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	[illegible]	[illegible]	14,897	14,353	1.05	15,056
1942	[illegible]	[illegible]	15,381	15,153	1.02	15,520
1943	[illegible]	.90	11,502	12,224	.95	11,611
1944	[illegible]	.94	13,607	13,942	.99	13,753
1945	12,512	.92	11,512	12,031	.97	11,624
1946	10,608	.91	9,644	10,191	.96	9,763
1947	10,959	.94	10,283	10,329	1.01	10,382
1948	13,051	.90	11,713	12,607	.93	11,780
1949	13,566	.83	11,250	13,030	.87	11,285
1950	12,016	.84	10,046	11,774	.86	10,110
1951	9,870	.91	9,005	9,622	.94	9,068
1952	15,816	.85	13,401	15,462	.87	13,450
1953	11,302	.89	10,093	11,130	.91	10,143
1954	10,514	.94	9,913	10,421	.96	9,969
1955	8,589	1.09	9,393	8,496	1.11	9,429
1956	7,812	1.14	8,918	7,714	1.16	8,938
1957	9,323	1.04	9,681	9,231	1.06	9,740
1958	11,877	.86	10,243	11,816	.87	10,283
1959	9,282	.84	7,841	9,282	.84	7,841
1960	8,997	.91	8,209	8,997	.91	8,209
1961	8,586	.95	8,139	8,586	.95	8,139
Total	242,470		224,671	236,411		226,093
Average	11,546	0.93	10,699	11,258	0.96	10,766

1/ Estimated from data taken near intake towers of Lake Mead.
2/ Average of adjacent values.

Measured flow record entire period.

Table 16

Colorado River Basin

Flow and Quality of Water Data

Colorado River below Parker Dam, Arizona – California

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	627	1.09	683			
	Feb.	561	1.12	628			
	March	750	1.11	833			
	April	608	1.09	663			
	May	1,359	1.09	1,481			
	June	1,628	1.08	1,758			
1941	July	998	1.07	1,068			
	Aug.	1,332	1.01	1,345			
	Sept.	1,528	.95	1,452			
	Oct.	1,585	.95	1,506			
	Nov.	1,731	.92	1,593			
	Dec.	2,042	1.00	2,042			
	Total	14,749	1.02	15,052	13,141	1.07	14,095
	Jan.	1,957	.97	1,898			
	Feb.	1,482	.97	1,438			
	March	1,494	.96	1,434			
	April	1,136	.98	1,113			
	May	1,588	.98	1,556			
	June	1,536	.98	1,505			
1942	July	1,226	.95	1,165			
	Aug.	880	1.04	915			
	Sept.	797	.97	773			
	Oct.	845	.96	811			
	Nov.	1,041	.96	999			
	Dec.	1,213	.87	1,055			
	Total	15,195	.96	14,662	13,514	1.02	13,765
	Jan.	1,015	.91	924			
	Feb.	746	.86	642			
	March	886	.95	842			
	April	877	.93	816			
	May	957	.95	909			
	June	976	.96	937			
1943	July	1,086	.89	967			
	Aug.	990	.89	881			
	Sept.	1,006	.88	885			
	Oct.	1,160	.89	1,032			
	Nov.	1,149	.85	977			
	Dec.	1,231	.85	1,046			
	Total	12,079	.90	10,858	10,520	.95	10,003
	Jan.	1,241	.88	1,092			
	Feb.	1,223	.90	1,101			
	March	1,297	.93	1,206			
	April	1,164	.95	1,106			
	May	1,116	.95	1,060			
	June	983	.96	944			
1944	July	1,035	.93	963			
	Aug.	1,148	.93	1,068			
	Sept.	1,114	.87	969			
	Oct.	1,178	.86	1,013			
	Nov.	1,156	.86	994			
	Dec.	1,187	.91	1,080			
	Total	13,842	.91	12,596	12,306	.96	11,781
	Jan.	1,186	.92	1,091			
	Feb.	1,061	.89	944			
	March	1,232	.91	1,121			
	April	985	.92	906			
	May	970	.92	892			
	June	919	.97	891			
1945	July	913	.90	822			
	Aug.	770	.88	678			
	Sept.	824	.89	733			
	Oct.	1,038	.83	862			
	Nov.	1,036	.87	901			
	Dec.	1,099	.88	967			
	Total	12,033	.90	10,808	10,508	.95	9,981
	Jan.	1,041	.88	916			
	Feb.	1,028	.94	966			
	March	944	.87	821			
	April	830	.90	747			
	May	873	.92	803			
	June	754	.90	679			
1946	July	801	.89	713			
	Aug.	722	.87	628			
	Sept.	730	.89	650			
	Oct.	759	.89	676			
	Nov.	789	.89	702			
	Dec.	870	.89	774			
	Total	10,141	.89	9,075	8,705	.95	8,281
	Jan.	953	0.89	848			
	Feb.	899	.90	809			
	March	940	.92	865			
	April	797	.95	757			
	May	905	.96	869			
	June	860	.96	826			
1947	July	844	.95	802			
	Aug.	892	.94	838			
	Sept.	819	.95	778			
	Oct.	837	.89	745			
	Nov.	880	.85	748			
	Dec.	1,037	.81	840			
	Total	10,663	.91	9,725	9,016	0.99	8,892
	Jan.	1,160	.93	1,079			
	Feb.	1,160	.89	1,032			
	March	1,107	.89	985			
	April	1,083	.90	975			
	May	1,115	.89	992			
	June	989	.91	900			
1948	July	1,108	.88	975			
	Aug.	986	.87	858			
	Sept.	941	.86	809			
	Oct.	918	.84	771			
	Nov.	978	.79	773			
	Dec.	1,106	.90	995			
	Total	12,651	.88	11,144	11,299	.92	10,410
	Jan.	1,229	.87	1,069			
	Feb.	1,192	.83	989			
	March	1,236	.82	1,014			
	April	1,116	.86	960			
	May	983	.86	845			
	June	923	.87	803			
1949	July	952	.87	828			
	Aug.	1,013	.82	831			
	Sept.	1,099	.81	890			
	Oct.	1,148	.78	895			
	Nov.	1,011	.75	758			
	Dec.	1,158	.72	834			
	Total	13,060	.82	10,716	11,600	.86	9,989
	Jan.	1,080	.84	907			
	Feb.	1,036	.83	860			
	March	1,209	.82	991			
	April	998	.86	858			
	May	1,066	.86	917			
	June	900	.85	765			
1950	July	897	.83	745			
	Aug.	833	.82	683			
	Sept.	704	.82	577			
	Oct.	651	.84	547			
	Nov.	542	.86	466			
	Dec.	557	.87	485			
	Total	10,473	.84	8,801	9,308	.87	8,089
	Jan.	550	.87	479			
	Feb.	501	.88	441			
	March	730	.88	642			
	April	765	.87	666			
	May	675	.88	594			
	June	862	.88	759			
1951	July	945	.89	841			
	Aug.	945	.87	822			
	Sept.	723	.86	622			
	Oct.	709	.88	624			
	Nov.	560	.88	493			
	Dec.	707	.89	629			
	Total	8,672	.88	7,612	7,553	.91	6,910
	Jan.	1,104	.89	983			
	Feb.	1,134	.87	987			
	March	1,424	.87	1,239			
	April	1,300	.90	1,170			
	May	1,443	.92	1,328			
	June	1,419	.92	1,305			
1952	July	1,263	.88	1,111			
	Aug.	1,296	.83	1,076			
	Sept.	1,321	.79	1,044			
	Oct.	1,234	.74	913			
	Nov.	1,172	.69	809			
	Dec.	1,303	.67	873			
	Total	15,413	.83	12,838	14,151	.86	12,114

Table 16

Colorado River Basin

Flow and Quality of Water Data

Colorado River below Parker Dam, Arizona – California

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1953	Jan.	1,198	0.66	791			
	Feb.	1,020	.81	826			
	March	947	.88	833			
	April	808	.91	735			
	May	953	.90	858			
	June	956	.90	860			
	July	1,093	.87	951			
	Aug.	1,056	.84	887			
	Sept.	823	.83	683			
	Oct.	634	.84	533			
	Nov.	527	.85	448			
	Dec.	634	.85	539			
	Total	10,649	.84	8,944	9,603	0.86	8,255
1954	Jan.	797	.84	669			
	Feb.	661	.83	549			
	March	782	.84	657			
	April	864	.84	726			
	May	1,015	.89	903			
	June	883	.92	812			
	July	1,000	.91	910			
	Aug.	982	.91	894			
	Sept.	754	.91	686			
	Oct.	636	.92	585			
	Nov.	638	.92	587			
	Dec.	659	.92	606			
	Total	9,671	.89	8,584	8,816	.90	7,967
1955	Jan.	734	.93	683			
	Feb.	598	.94	562			
	March	733	.96	704			
	April	758	.97	735			
	May	792	.99	784			
	June	866	1.03	892			
	July	963	1.07	1,030			
	Aug.	849	1.06	900			
	Sept.	694	1.04	722			
	Oct.	499	1.06	529			
	Nov.	369	1.09	402			
	Dec.	286	1.09	312			
	Total	8,141	1.01	8,255	7,362	1.03	7,595
1956	Jan.	317	1.10	349			
	Feb.	365	1.10	402			
	March	628	1.10	691			
	April	684	1.09	746			
	May	671	1.07	718			
	June	787	1.09	858			
	July	865	1.10	952			
	Aug.	823	1.09	897			
	Sept.	634	1.12	710			
	Oct.	486	1.08	525			
	Nov.	321	1.11	356			
	Dec.	288	1.14	328			
	Total	6,869	1.10	7,532	6,150	1.12	6,870
1957	Jan.	243	1.15	279			
	Feb.	349	1.12	391			
	March	589	1.09	642			
	April	731	1.06	775			
	May	645	1.06	684			
	June	783	1.05	822			
	July	890	1.03	917			
	Aug.	817	1.01	825			
	Sept.	661	.99	654			
	Oct.	503	1.00	503			
	Nov.	781	1.00	781			
	Dec.	1,005	1.01	1,015			
	Total	7,997	1.04	8,288	7,397	1.06	7,816
1958	Jan.	1,285	.97	1,246			
	Feb.	565	.93	525			
	March	1,345	.89	1,197			
	April	1,333	.87	1,160			
	May	1,013	.85	861			
	June	854	.84	717			
	July	930	.84	781			
	Aug.	867	.82	711			
	Sept.	714	.81	578			
	Oct.	610	.82	500			
	Nov.	623	.82	511			
	Dec.	753	.83	625			
	Total	10,892	.86	9,412	10,269	.87	8,968
1959	Jan.	677	0.82	555			
	Feb.	593	.82	486			
	March	690	.82	566			
	April	832	.83	691			
	May	706	.86	607			
	June	797	.87	[illegible]			
	July	962	.84	[illegible]			
	Aug.	873	.79	[illegible]			
	Sept.	682	.80	[illegible]			
	Oct.	558	.83	463			
	Nov.	405	.84	340			
	Dec.	411	.83	341			
	Total	8,186	.83	6,786	7,792	0.83	6,459
1960	Jan.	428	.82	351			
	Feb.	474	.81	384			
	March	760	.81	616			
	April	810	.85	689			
	May	740	.86	636			
	June	879	.88	774			
	July	986	.87	858			
	Aug.	868	.88	764			
	Sept.	640	.87	557			
	Oct.	490	.86	421			
	Nov.	397	.89	353			
	Dec.	322	.91	293			
	Total	7,794	.86	6,696	7,585	.86	6,518
1961	Jan.	379	.91	345			
	Feb.	453	.90	408			
	March	742	.90	668			
	April	725	.90	653			
	May	705	.92	649			
	June	822	.92	756			
	July	900	.91	819			
	Aug.	710	.91	646			
	Sept.	606	.90	545			
	Oct.	412	.90	371			
	Nov.	319	.94	300			
	Dec.	202	.94	190			
	Total	6,975	.91	6,350	6,975	.91	6,350

ANNUAL SUMMARY

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	14,749	1.02	15,052	13,141	1.07	14,095
1942	15,195	.96	14,662	13,514	1.02	13,765
1943	12,079	.90	10,858	10,520	.95	10,003
1944	13,842	.91	12,596	12,306	.96	11,781
1945	12,033	.90	10,808	10,508	.95	9,981
1946	10,141	.89	9,075	8,705	.95	8,281
1947	10,663	.91	9,725	9,016	.99	8,892
1948	12,651	.88	11,144	11,299	.92	10,410
1949	13,060	.82	10,716	11,600	.86	9,989
1950	10,473	.84	8,801	9,308	.87	8,089
1951	8,672	.88	7,612	7,553	.91	6,910
1952	15,413	.83	12,838	14,151	.86	12,114
1953	10,649	.84	8,944	9,603	.86	8,255
1954	9,671	.89	8,584	8,816	.90	7,967
1955	8,141	1.01	8,255	7,362	1.03	7,595
1956	6,869	1.10	7,532	6,150	1.12	6,870
1957	7,997	1.04	8,288	7,397	1.06	7,816
1958	10,892	.86	9,412	10,269	.87	8,968
1959	8,186	.83	6,786	7,792	.83	6,459
1960	7,794	.86	6,696	7,585	.86	6,518
1961	6,975	.91	6,350	6,975	.91	6,350
Total	226,145		204,734	203,570		191,108
Average	10,769	0.91	9,749	9,694	0.94	9,100

Records furnished by Metropolitan Water District of Southern California in Report No. 815, dated November 1963.

Table 17

Colorado River Basin

Flow and Quality of Water Data

Colorado River at Imperial Dam, Arizona - California

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	Jan.	642	1.10	706			
	Feb.	535	1.15	615			
	March	743	.90	669			
	April	562	1.04	584			
	May	1,150	1.11	1,277			
	June	1,605	1.21	1,942			
	July	965	1.17	1,129			
	Aug.	1,192	1.09	1,299			
	Sept.	1,444	.99	1,430			
	Oct.	1,505	1.02	1,535			
	Nov.	1,671	1.02	1,704			
	Dec.	2,010	1.04	2,090			
	Total	14,024	1.07	14,980	12,160	1.16	14,160
1942	Jan.	1,876	1.08	2,026			
	Feb.	1,590	1.09	1,733			
	March	1,476	1.09	1,609			
	April	1,080	1.11	1,199			
	May	1,524	1.10	1,676			
	June	1,465	1.11	1,626			
	July	1,199	1.11	1,331			
	Aug.	844	1.09	920			
	Sept.	742	1.11	824			
	Oct.	761	1.08	822			
	Nov.	981	1.03	1,010			
	Dec.	1,176	.97	1,141			
	Total	14,714	1.08	15,917	12,804	1.18	15,147
1943	Jan.	1,011	.94	950			
	Feb.	729	.92	671			
	March	846	.95	804			
	April	802	.96	770			
	May	842	.98	825			
	June	876	.98	858			
	July	972	.95	923			
	Aug.	910	.94	855			
	Sept.	917	.94	862			
	Oct.	1,094	.94	1,028			
	Nov.	1,124	.93	1,045			
	Dec.	1,222	.89	1,088			
	Total	11,345	.94	10,679	9,548	1.04	9,955
1944	Jan.	1,209	.89	1,076			
	Feb.	1,216	.94	1,143			
	March	1,289	.97	1,250			
	April	1,126	1.00	1,126			
	May	1,055	1.01	1,066			
	June	900	1.02	918			
	July	920	.99	911			
	Aug.	1,041	.97	1,010			
	Sept.	1,041	.94	979			
	Oct.	1,123	.92	1,033			
	Nov.	1,142	.89	1,016			
	Dec.	1,143	.89	1,017			
	Total	13,205	.95	12,545	11,443	1.04	11,858
1945	Jan.	1,160	.99	1,137			
	Feb.	1,047	.97	1,016			
	March	1,193	.97	1,157			
	April	947	.98	928			
	May	905	1.00	905			
	June	860	.99	851			
	July	817	.96	784			
	Aug.	718	.94	675			
	Sept.	745	.92	685			
	Oct.	912	.88	803			
	Nov.	1,011	.89	900			
	Dec.	1,075	.93	1,000			
	Total	11,390	.95	10,841	9,651	1.05	10,135
1946	Jan.	1,008	.94	948			
	Feb.	1,005	.92	925			
	March	927	.94	871			
	April	759	.96	729			
	May	786	.98	770			
	June	658	.99	651			
	July	719	.97	697			
	Aug.	666	.94	626			
	Sept.	639	.95	607			
	Oct.	707	.97	686			
	Nov.	757	.96	727			
	Dec.	855	.94	804			
	Total	9,486	.95	9,041	7,848	1.07	8,360
1947	Jan.	933	[illegible]	[illegible]			
	Feb.	872	[illegible]	[illegible]			
	March	934	[illegible]	[illegible]			
	April	737	[illegible]	[illegible]			
	May	827	1.01	835			
	June	787	1.02	803			
	July	743	1.01	750			
	Aug.	830	.99	822			
	Sept.	733	1.00	733			
	Oct.	753	.95	715			
	Nov.	851	.90	766			
	Dec.	1,041	.87	906			
	Total	10,041	.97	9,711	8,221	1.09	8,977
1948	Jan.	1,106	.97	1,073			
	Feb.	1,135	.94	1,067			
	March	1,092	.95	1,037			
	April	1,007	.94	947			
	May	1,051	.95	998			
	June	916	.95	870			
	July	1,003	.95	953			
	Aug.	906	.94	852			
	Sept.	871	.91	793			
	Oct.	901	.89	802			
	Nov.	945	.86	813			
	Dec.	1,103	.94	1,037			
	Total	12,036	.93	11,242	10,531	1.01	10,596
1949	Jan.	1,237	.92	1,138			
	Feb.	1,183	.88	1,041			
	March	1,226	.88	1,079			
	April	1,084	.91	986			
	May	927	.92	853			
	June	871	.93	810			
	July	860	.92	791			
	Aug.	934	.88	822			
	Sept.	996	.86	857			
	Oct.	1,103	.83	915			
	Nov.	1,000	.93	930			
	Dec.	1,146	.77	882			
	Total	12,567	.88	11,104	10,959	.95	10,461
1950	Jan.	1,088	.89	968			
	Feb.	994	.87	865			
	March	1,169	.88	1,029			
	April	936	.90	842			
	May	1,002	.91	912			
	June	841	.89	748			
	July	822	.89	732			
	Aug.	758	.88	667			
	Sept.	643	.87	559			
	Oct.	603	.94	567			
	Nov.	510	.95	485			
	Dec.	540	.95	513			
	Total	9,906	.90	8,887	8,628	.95	8,239
1951	Jan.	558	.95	530			
	Feb.	498	.96	478			
	March	635	.96	610			
	April	744	.96	714			
	May	606	.99	600			
	June	703	.98	689			
	July	820	.98	804			
	Aug.	853	.95	810			
	Sept.	697	.93	648			
	Oct.	682	.96	655			
	Nov.	559	.97	542			
	Dec.	698	.98	684			
	Total	8,053	.96	7,764	6,861	1.04	7,105
1952	Jan.	1,058	.95	1,005			
	Feb.	1,107	.96	1,063			
	March	1,424	.92	1,310			
	April	1,279	.97	1,241			
	May	1,345	1.00	1,345			
	June	1,309	.99	1,296			
	July	1,182	.97	1,147			
	Aug.	1,178	.92	1,084			
	Sept.	1,219	.87	1,061			
	Oct.	1,240	.84	1,042			
	Nov.	1,176	.78	917			
	Dec.	1,298	.75	974			
	Total	14,815	.91	13,485	13,488	.95	12,795

Table 17
Colorado River Basin
Flow and Quality of Water Data
Colorado River at Imperial Dam, Arizona - California

Units - 1000

Year	Month	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
	Jan.	1,216	0.77	936			
	Feb.	1,022	.89	910			
	March	911	.95	865			
	April	756	1.01	764			
	May	856	1.01	865			
	June	811	1.00	811			
1953	July	980	.96	941			
	Aug.	931	.95	884			
	Sept.	776	.93	722			
	Oct.	644	.96	618			
	Nov.	522	.97	506			
	Dec.	620	.95	589			
	Total	10,045	.94	9,411	8,927	.98	8,749
	Jan.	783	.94	736			
	Feb.	661	.94	621			
	March	723	.94	680			
	April	773	.94	727			
	May	929	1.05	975			
	June	804	1.03	828			
1954	July	885	1.01	894			
	Aug.	887	1.03	914			
	Sept.	719	1.02	733			
	Oct.	620	1.03	639			
	Nov.	602	1.02	614			
	Dec.	644	1.03	663			
	Total	9,030	1.00	9,024	8,102	1.04	8,435
	Jan.	739	1.00	739			
	Feb.	593	1.03	611			
	March	678	1.07	725			
	April	716	1.09	780			
	May	729	1.13	824			
	June	746	1.20	895			
1955	July	882	1.21	1,067			
	Aug.	811	1.18	957			
	Sept.	638	1.17	746			
	Oct.	499	1.20	599			
	Nov.	379	1.24	470			
	Dec.	298	1.29	384			
	Total	7,708	1.14	8,797	6,892	1.18	8,155
	Jan.	298	1.31	390			
	Feb.	344	1.24	427			
	March	546	1.24	677			
	April	646	1.23	795			
	May	594	1.26	748			
	June	666	1.25	833			
1956	July	753	1.25	941			
	Aug.	717	1.22	875			
	Sept.	583	1.24	723			
	Oct.	479	1.24	594			
	Nov.	343	1.28	439			
	Dec.	297	1.30	386			
	Total	6,266	1.25	7,828	5,510	1.30	7,185
	Jan.	258	1.36	351			
	Feb.	314	1.32	414			
	March	520	1.23	640			
	April	667	1.18	787			
	May	581	1.19	691			
	June	651	1.19	775			
1957	July	794	1.22	969			
	Aug.	759	1.08	820			
	Sept.	616	1.12	690			
	Oct.	511	1.16	593			
	Nov.	695	1.14	792			
	Dec.	978	1.10	1,076			
	Total	7,344	1.17	8,598	6,719	1.21	8,139
	Jan.	1,299	1.05	1,364			
	Feb.	637	1.07	682			
	March	1,253	1.06	1,328			
	April	1,280	1.02	1,306			
	May	1,016	1.00	1,016			
	June	769	1.01	777			
1958	July	812	.96	780			
	Aug.	802	.97	778			
	Sept.	655	.97	635			
	Oct.	624	1.01	630			
	Nov.	592	1.00	592			
	Dec.	761	.97	738			
	Total	10,500	1.01	10,626	9,858	1.03	10,192
	Jan.	674	0.99	667			
	Feb.	592	.99	586			
	March	618	1.02	630			
	April	770	[illegible]	[illegible]			
	May	646	1.05	[illegible]			
	June	679	1.05	[illegible]			
1959	July	824	.99	[illegible]			
	Aug.	821	1.04	[illegible]			
	Sept.	644	1.04	670			
	Oct.	565	1.03	582			
	Nov.	421	1.04	438			
	Dec.	441	1.01	445			
	Total	7,695	1.02	7,843	7,290	1.03	7,522
	Jan.	449	1.02	458			
	Feb.	436	1.00	436			
	March	651	.99	644			
	April	762	.99	754			
	May	650	1.07	696			
	June	736	1.07	788			
1960	July	845	1.07	904			
	Aug.	777	1.06	824			
	Sept.	606	1.09	661			
	Oct.	481	1.10	529			
	Nov.	360	1.14	410			
	Dec.	354	1.15	407			
	Total	7,107	1.06	7,511	6,890	1.07	7,338
	Jan.	342	1.18	404			
	Feb.	400	1.15	460			
	March	648	1.10	713			
	April	666	1.08	719			
	May	618	1.14	705			
	June	691	1.08	746			
1961	July	755	1.09	823			
	Aug.	671	1.12	752			
	Sept.	541	1.14	617			
	Oct.	427	1.10	470			
	Nov.	312	1.12	349			
	Dec.	222	1.18	262			
	Total	6,293	1.12	7,020	6,291	1.12	7,021

ANNUAL SUMMARY

Year	Historical Flow (A.F.)	Historical Concentration (T./A.F.)	Historical T.D.S. (Tons)	Present Modified Flow (A.F.)	Present Modified Concentration (T./A.F.)	Present Modified T.D.S. (Tons)
1941	14,024	1.07	14,980	12,160	1.16	14,160
1942	14,714	1.08	15,917	12,804	1.18	15,147
1943	11,345	.94	10,679	9,548	1.04	9,955
1944	13,205	.95	12,545	11,443	1.04	11,858
1945	11,390	.95	10,841	9,651	1.05	10,135
1946	9,486	.95	9,041	7,848	1.07	8,360
1947	10,041	.97	9,711	8,221	1.09	8,977
1948	12,036	.93	11,242	10,531	1.01	10,596
1949	12,567	.88	11,104	10,959	.95	10,461
1950	9,906	.90	8,887	8,628	.95	8,239
1951	8,053	.96	7,764	6,861	1.04	7,105
1952	14,815	.91	13,485	13,488	.95	12,795
1953	10,045	.94	9,411	8,927	.98	8,749
1954	9,030	1.00	9,024	8,102	1.04	8,435
1955	7,708	1.14	8,797	6,892	1.18	8,155
1956	6,266	1.25	7,828	5,510	1.30	7,185
1957	7,344	1.17	8,598	6,719	1.21	8,139
1958	10,500	1.01	10,626	9,858	1.03	10,192
1959	7,695	1.02	7,843	7,290	1.03	7,522
1960	7,107	1.06	7,511	6,890	1.07	7,338
1961	6,293	1.12	7,020	6,291	1.12	7,021
Total	213,570		212,854	188,621		200,524
Average	10,170	1.00	10,136	8,982	1.06	9,549

Table 18

Table 18

Summary of Anticipated Effects of Additional Developments on Quality of Water at Seventeen Stations

Colorado River Basin

Units--1,000 except concentrations

Station	Present Modified condition: Flow (AF)	Present Modified condition: Concentration (T/AF)	Present Modified condition: T.D.S. (T)	Effects of storage unit operations - Increment No. 1	Flow [2] adjustment (AF)	Flow (AF)	Concentration (T/AF)	T.D.S. adjustment (T)	T.D.S. (T)
1	2	3	4		5	6	7	8	9
Green River near Green River, Wyoming	1,269	0.43	541						
Green River near Greendale, Utah	1,614	0.53	855	Flaming Gorge Unit	-9	1,605	0.55	30	885
Duchesne River near Randlett, Utah	404	0.98	397						
Green River near Ouray, Utah	4,105	0.53	2,170	Flaming Gorge Unit	-9	4,096	0.54	30	2,200
Green River at Green River, Utah	4,136	0.62	2,546	Flaming Gorge Unit	-9	4,127	0.62	30	2,576
San Rafael River near Green River, Utah	98	2.20	216						
Colorado River near Cameo, Colorado	2,664	0.58	1,538						
Gunnison River near Grand Junction, Colorado	1,750	0.85	1,490	Curecanti Unit	-18	1,732	0.86	-1	1,489
Colorado River near Cisco, Utah	4,921	0.87	4,280	Curecanti Unit	-18	4,903	0.87	-1	4,279
San Juan River near Archuleta, New Mexico	983	0.21	208	Navajo Unit	-51	932	0.22	-3	205
San Juan River near Bluff, Utah	1,730	0.57	979	Navajo Unit	-51	1,679	0.58	-3	976
Colorado River at Lees Ferry, Arizona	11,296	0.76	8,626	Increment No. 1	-623	10,673	0.77	-430	8,196
Colorado River near Grand Canyon, Arizona	11,545	0.85	9,850	Increment No. 1	-623	10,922	0.86	-430	9,420
Virgin River at Littlefield, Arizona	160	2.24	358						
Colorado River below Hoover Dam, Arizona-Nevada	11,258	0.96	10,766	Increment No. 1	-623	10,635	0.97	-430	10,336
Colorado River below Parker Dam, Arizona-California	9,694	0.94	9,100	Increment No. 1	-623	9,071	0.96	-430	8,670
Colorado River at Imperial Dam, Arizona-California	8,982	1.06	9,549	Increment No. 1	-623	8,359	1.09	-430	9,119

Station	Effects of developments - Increment No. 2	Zero pickup: Flow adjustment (AF)	Zero pickup: Flow (AF)	Zero pickup: Concentration (T/AF)	Zero pickup: T.D.S. adjustment (T)	Zero pickup: T.D.S. (T)	T.D.S. pickup at 2T/A: T.D.S. adjustment (T)	T.D.S. pickup at 2T/A: Concentration (T/AF)	T.D.S. pickup at 2T/A: T.D.S. (T)
1		10	11	12	13	14	15	16	17
Green River near Green River, Wyoming	Seedskadee	-125	1,144	0.47	0	541	87	0.55	628
Green River near Greendale, Utah	Seedskadee, Lyman, and Utah Power & Light Company	-152	1,453	0.61	0	885	87	0.67	972
Duchesne River near Randlett, Utah	Central Utah - Bonneville and Upalco Units	-177	227	1.59	-35	362	2	1.60	364
Green River near Ouray, Utah	Seedskadee, Lyman, Savery-Pot Hook, Central Utah--all units, Utah Power & Light Co., Little Snake Diversions	-389	3,707	0.58	-36	2,164	133	0.62	2,297
Green River at Green River, Utah	Seedskadee, Lyman, Savery-Pot Hook, Central Utah--all units, Utah Power & Light Co., Little Snake Diversions	-389	3,738	0.68	-36	2,540	133	0.71	2,673
San Rafael River near Green River, Utah	Emery County Project	-17	81	2.70	0	216	2	2.70	218
Colorado River near Cameo, Colorado	East slope diversions[1] and Silt Project	-260	2,404	0.63	-25	1,513	4	0.63	1,517
Gunnison River near Grand Junction, Colorado	Paonia, Smith Fork, Fruitland Mesa, and Bostwick Park	-47	1,685	0.88	0	1,490	43	0.91	1,532
Colorado River near Cisco, Utah	East slope diversions[1] Silt, Fruitland Mesa, Bostwick Park, Paonia, Collbran and Smith Fork Projects	-314	4,589	0.93	-25	4,254	52	0.94	4,306
San Juan River near Archuleta, New Mexico									
San Juan River near Bluff, Utah	Hammond, Florida, and Utah Construction Company	-62	1,617	0.60	0	976	17	0.61	993
Colorado River at Lees Ferry, Arizona	Increment No. 2	-788	9,885	0.82	-61	8,135	206	0.84	8,341
Colorado River near Grand Canyon, Arizona	Increment No. 2	-788	10,134	0.92	-61	9,359	206	0.94	9,565
Virgin River at Littlefield, Arizona									
Colorado River below Hoover Dam, Arizona-Nevada	Increment No. 2	-788	9,847	1.04	-61	10,275	206	1.06	10,481
Colorado River below Parker Dam, Arizona-California	Increment No. 2	-788	8,283	1.04	-61	8,609	206	1.06	8,815
Colorado River at Imperial Dam, Arizona-California	Increment No. 2	-788	7,571	1.20	-61	9,058	206	1.22	9,264

Station	Effects of developments - Increment No. 3	Zero pickup: Flow adjustment (AF)	Zero pickup: Flow (AF)	Zero pickup: Concentration (T/AF)	Zero pickup: T.D.S. adjustment (T)	Zero pickup: T.D.S. (T)	T.D.S. pickup at 2T/A: T.D.S. adjustment (T)	T.D.S. pickup at 2T/A: Concentration (T/AF)	T.D.S. pickup at 2T/A: T.D.S. (T)
1		18	19	20	21	22	23	24	25
San Juan River near Archuleta, New Mexico	San Juan-Chama and Navajo Indian Irrigation Projects	-609	323	0.24	-128	77			
San Juan River near Bluff, Utah	San Juan-Chama and Navajo Indian Irrigation Projects	-354	1,263	0.76	-16	960	220	0.95	1,197
Colorado River at Lees Ferry, Arizona	Increment No. 3	-354	9,531	0.85	-16	8,119	220	0.90	8,543
Colorado River near Grand Canyon, Arizona	Increment No. 3	-354	9,780	0.96	-16	9,343	220	1.00	9,767
Colorado River below Hoover Dam, Arizona-Nevada	Increment No. 3	-354	9,493	1.08	-16	10,259	220	1.13	10,683
Colorado River below Parker Dam, Arizona-California	Increment No. 3	-354	7,929	1.08	-16	8,593	220	1.14	9,017
Colorado River at Imperial Dam, Arizona-California	Increment No. 3	-354	7,217	1.25	-16	9,042	220	1.31	9,466

Station	Effects of developments - Increment No. 4	Zero pickup: Flow adjustment (AF)	Zero pickup: Flow (AF)	Zero pickup: Concentration (T/AF)	Zero pickup: T.D.S. adjustment (T)	Zero pickup: T.D.S. (T)	T.D.S. pickup at 2T/A: T.D.S. adjustment (T)	T.D.S. pickup at 2T/A: Concentration (T/AF)	T.D.S. pickup at 2T/A: T.D.S. (T)
1		26	27	28	29	30	31	32	33
Colorado River near Cameo, Colorado	Fryingpan-Arkansas Project	-67	2,337	0.65	-4	1,509	0	0.65	1,513
Colorado River near Cisco, Utah	Fryingpan-Arkansas Project	-67	4,522	[illegible]	-4	4,250	0	0.95	4,302
Colorado River at Lees Ferry, Arizona	Increment No. 4	-67	9,464	0.86	-4	8,115	0	0.90	8,539
Colorado River near Grand Canyon, Arizona	Increment No. 4	-67	9,713	0.96	-4	9,339	0	1.01	9,763
Colorado River below Hoover Dam, Arizona-Nevada	Increment No. 4	-67	9,426	1.09	-4	10,255	0	1.13	10,679
Colorado River below Parker Dam, Arizona-California	Increment No. 4	-67	7,862	1.09	-4	8,589	0	1.15	9,013
Colorado River at Imperial Dam, Arizona-California	Increment No. 4	-67	7,150	1.26	-4	9,038	0	1.32	9,462

Station	Effects of developments - Increment No. 5	Zero pickup: Flow adjustment (AF)	Zero pickup: Flow (AF)	Zero pickup: Concentration (T/AF)	Zero pickup: T.D.S. adjustment (T)	Zero pickup: T.D.S. (T)	T.D.S. pickup at 2T/A: T.D.S. Adjustment (T)	T.D.S. pickup at 2T/A: Concentration (T/AF)	T.D.S. pickup at 2T/A: T.D.S. (T)
1		34	35	36	37	38	39	40	41
Colorado River near Grand Canyon, Arizona	Marble Canyon	-14	9,699	0.96	0	9,339	0	1.01	9,763
Virgin River at Littlefield, Arizona	Dixie Project	-62	98	3.65	0	358	24	3.90	382
Colorado River below Hoover Dam, Arizona-Nevada	Marble Canyon, Bridge Canyon, Dixie Projects	-178	9,248	1.11	0	10,255	24	1.16	10,703
Colorado River below Parker Dam, Arizona-California	Increment No. 5	-178	7,684	1.12	0	8,589	24	1.18	9,037
Colorado River at Imperial Dam, Arizona-California	Increment No. 5	-178	6,972	1.30	0	9,038	24	1.36	9,486

1/ Diversions to Denver, Englewood, Colorado Springs, and Aurora, Colorado.
2/ This column reflects reservoir changes in storage as well as reservoir evaporation losses.

Table No. 19
PROJECTS DEPLETING COLORADO RIVER WATER

Increment No. 1
Storage Units of the Colorado River Storage Project

Storage Unit	Depletions (Reservoir losses 1/ - acre-feet)
Glen Canyon	546,000
Flaming Gorge	52,000
Navajo	36,000
Curecanti	15,000
Subtotal	649,000

Project and State	New Depletions (Acre-feet)	New Irrigated Land (Acres)
Increment No. 2 — Participating Projects and Other Miscellaneous Projects		
Lyman, Wyoming	10,000	0
Silt, Colorado	6,000	2,120
Paonia, Colorado	10,000	2,230
Emery County, Utah	17,000	770
Florida, Colorado	14,000	5,730
Hammond, New Mexico	9,000	3,900
Seedskadee, Wyoming	125,000	43,420
Smith Fork, Colorado	6,000	1,320
Central Utah, Utah		
Bonneville Unit	173,000	2/
Jensen Unit	3,000	1,240
Upalco Unit	4,000	0
Vernal Unit	12,000	0
Denver, Englewood, and Colorado Springs Diversions	181,000	2/
Collbran, Colorado	7,000	2,460
Little Snake Diversions, Wyoming	7,000	2/
Homestake Project, Colorado	73,000	2/

1/ Based on a 1941-1961 reservoir operation study assuming 1975 conditions.

2/ Averages based on 1941-1961 runoff conditions.

Table No. 19 (Continued)

Project and State	New Depletions (Acre-feet)	New Irrigated Land (Acres)
Increment No. 2 (Continued)		
Bostwick Park, Colorado	3,000	1,320
Savery-Pot Hook, Wyoming-Colorado	38,000	21,920
Fruitland Mesa, Colorado	28,000	16,520
Potash Development, Utah	6,000	2/
Utah Construction Co., New Mexico	39,000	2/
Utah Power & Light Co., Wyoming	17,000	2/
Subtotal	788,000	103,050
Increment No. 3 San Juan-Chama and Navajo Indian Irrigation Projects		
San Juan-Chama, Colorado-New Mexico	101,000	1/
Navajo Indian Irrigation, New Mexico	253,000	110,000
Subtotal	354,000	110,000
Increment No. 4 Fryingpan-Arkansas Project		
Fryingpan-Arkansas, Colorado	67,000	1/
Subtotal	67,000	
Increment No. 5 Lower Basin Projects		
Marble Canyon, Arizona	14,000	
Dixie, Utah	62,000	11,615
Bridge Canyon, Arizona	102,000	
Subtotal	178,000	11,615
Total (Colorado River)	2,036,000	224,565

1/ Transmountain Diversion
2/ Inbasin depletions without irrigated land

Table 20

(Units: 1,000) Dissolved constituent loads of Green River near Green River, Wyoming

Calendar year	Mean discharge (a.f.)	Ionic loads in equivalents per million times flow in acre-feet								TDS (tons)
		Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Total Ca+Mg +Na	Bicarbonate HCO_3	Sulfate SO_4	Chloride Cl	Total HCO_3 + SO_4+CL	
1941	1,109	2,741	1,584	1,548	5,873	3,141	2,589	170	5,900	527
1942	1,154	3,004	1,642	1,575	6,221	3,269	2,729	170	6,168	518
1943	1,680	3,802	2,120	1,903	7,825	4,709	3,134	212	8,055	641
1944	1,265	3,081	1,762	1,689	6,532	3,575	2,829	173	6,577	536
1945	1,150	2,738	1,582	1,566	5,886	3,149	2,592	171	5,912	519
1946	1,225	3,084	1,749	1,727	6,560	3,524	2,931	188	6,643	564
1947	1,926	4,273	2,345	2,059	8,677	5,342	3,337	229	8,908	714
1948	1,113	2,782	1,610	1,522	5,914	3,178	2,677	184	6,039	510
1949	1,205	3,041	1,689	1,618	6,348	3,409	2,710	176	6,295	541
1950	2,096	4,626	2,586	2,293	9,505	5,920	3,646	247	9,813	794
1951	1,972	4,514	2,581	2,022	9,117	5,543	3,418	240	9,201	716
1952	1,496	3,434	1,990	1,838	7,262	4,088	2,992	214	7,294	597
1953	1,084	2,590	1,556	1,495	5,641	2,980	2,506	161	5,647	465
1954	1,183	2,644	1,576	1,417	5,637	2,975	2,497	154	5,626	462
1955	837	1,989	1,246	1,307	4,542	2,137	2,265	142	4,544	381
1956	1,621	3,787	2,113	1,677	7,577	4,581	2,803	202	7,586	612
1957	1,548	3,526	1,839	1,849	7,214	4,163	2,934	227	7,324	594
1958	1,046	2,558	1,464	1,593	5,615	2,859	2,662	182	5,703	474
1959	953	2,320	1,262	1,404	4,986	2,537	2,322	145	5,004	415
1960	698	1,746	980	1,197	3,923	1,939	1,852	147	3,938	329
1961	559	1,262	744	937	2,943	1,468	1,401	109	2,978	243
Total	26,920	63,542	36,020	34,236	133,798	74,486	56,826	3,843	135,155	11,152
Mean	1,282	3,026	1,715	1,630	6,371	3,547	2,706	183	6,436	531

Table 21

(Units: 1,000) Dissolved constituent loads of Green River near Greendale, Utah

Calendar year	Mean discharge (a.f.)	Ionic loads in equivalents per million times flow in acre-feet: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Total Ca+Mg +Na	Bicarbonate HCO_3	Sulfate SO_4	Chloride Cl	Total HCO_3 + SO_4+CL	TDS (tons)
1941	1,521	5,247	3,104	3,648	11,999	4,951	6,022	849	11,822	957
1942	1,517	5,311	3,016	3,391	11,718	5,161	5,824	827	11,812	959
1943	2,089	5,238	3,079	3,315	11,632	5,759	5,185	694	11,638	928
1944	1,672	5,272	2,906	3,447	11,625	5,502	5,300	702	11,504	903
1945	1,497	4,545	2,683	3,019	10,247	4,615	4,602	669	9,886	826
1946	1,547	4,494	2,598	2,842	9,934	4,928	4,448	604	9,980	799
1947	2,447	6,481	3,672	4,142	14,295	7,419	5,895	956	14,270	1,143
1948	1,458	4,176	2,476	2,688	9,340	4,384	4,270	613	9,267	768
1949	1,583	5,798	3,085	3,573	12,456	5,835	5,670	773	12,278	969
1950	2,625	7,509	4,158	4,030	15,697	8,390	6,460	935	15,785	1,244
1951	2,334	6,632	3,761	3,705	14,098	7,520	5,642	821	13,983	1,118
1952	2,149	6,452	3,698	3,758	13,908	6,547	6,020	1,053	13,620	1,117
1953	1,282	3,978	2,500	2,877	9,355	4,164	4,215	594	8,973	725
1954	1,249	3,377	1,883	2,261	7,521	3,505	3,388	368	7,261	591
1955	1,021	2,852	1,542	2,250	6,644	2,787	3,288	409	6,484	538
1956	1,894	4,997	2,662	2,696	10,355	5,549	4,023	507	10,079	774
1957	2,020	5,281	3,045	3,640	11,966	5,916	5,353	754	12,023	1,011
1958	1,315	3,593	1,978	2,485	8,056	3,758	3,845	486	8,089	677
1959	1,190	3,457	2,067	2,620	8,144	3,536	4,149	528	8,213	687
1960	973	2,842	1,646	2,183	6,671	2,913	3,358	446	6,717	563
1961	781	2,333	1,321	1,773	5,427	2,272	2,857	366	5,495	460
Total	34,164	99,865	56,880	64,343	221,088	105,411	99,814	13,954	219,179	17,757
Mean	1,627	4,755	2,709	3,064	10,528	5,020	4,753	664	10,437	846

Table 22

(Units: 1,000) Dissolved constituent loads of Duchesne River near Randlett, Utah

Calendar year	Mean discharge (a.f.)	Ionic loads in equivalents per million times flow in acre-feet								TDS (tons)
		Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Total Ca+Mg +Na	Bicarbonate HCO_3	Sulfate SO_4	Chloride Cl	Total HCO_3 + SO_4+CL	
1941	694	2,203	1,704	2,259	6,166	2,525	2,968	740	6,233	837
1942	526	1,892	1,453	1,971	5,316	2,062	2,693	687	5,442	463
1943	460	1,773	1,480	1,996	5,249	1,964	2,717	690	5,371	454
1944	698	2,169	1,619	2,097	5,885	2,469	2,809	678	5,956	517
1945	407	1,700	1,491	1,992	5,183	1,922	2,700	627	5,249	440
1946	324	1,404	1,223	1,679	4,306	1,472	2,334	535	4,341	375
1947	569	1,930	1,553	2,129	5,612	2,189	2,804	642	5,635	489
1948	298	1,237	1,203	1,499	3,939	1,336	2,063	522	3,921	339
1949	641	2,054	1,594	2,097	5,745	2,393	2,682	669	5,744	497
1950	574	1,980	1,634	2,144	5,758	2,220	2,854	703	5,777	497
1951	448	1,784	1,572	2,229	5,585	1,825	3,032	723	5,580	477
1952	1,035	2,779	1,970	2,352	7,101	3,270	3,234	767	7,271	619
1953	326	1,360	1,178	1,619	4,157	1,430	2,164	578	4,172	366
1954	188	943	818	1,224	2,985	918	1,693	445	3,056	278
1955	245	1,146	1,023	1,474	3,643	1,154	2,024	528	3,706	323
1956	303	1,212	1,037	1,448	3,697	1,301	1,983	505	3,789	325
1957	456	1,636	1,388	1,975	4,999	1,727	2,707	605	5,039	429
1958	416	1,313	1,104	1,436	3,853	1,524	1,963	412	3,899	329
1959	166	750	726	1,151	2,627	774	1,516	350	2,640	221
1960	160	689	634	963	2,286	720	1,301	281	2,302	192
1961	145	688	640	975	2,303	670	1,344	308	2,322	196
Total	9,079	32,642	27,044	36,709	96,395	35,865	49,585	11,995	97,445	8,663
Mean	432	1,554	1,288	1,748	4,590	1,708	2,361	571	4,640	413

Table 23

(Units: 1,000) Dissolved constituent loads of Green River near Ouray, Utah

Calendar year	Mean discharge (a.f.)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Total Ca+Mg +Na	Bicarbonate HCO_3	Sulfate SO_4	Chloride Cl	Total HCO_3 + SO_4+CL	TDS (tons)
		Ionic loads in equivalents per million times flow in acre-feet								
1941	4,447	13,320	7,985	11,248	32,553	13,565	15,760	3,702	33,027	2,671
1942	4,535	12,695	7,483	10,175	30,353	13,075	14,150	3,285	30,510	2,544
1943	4,257	11,355	6,752	8,875	26,982	12,092	12,390	2,752	27,234	2,232
1944	4,357	11,795	6,537	9,090	27,422	12,655	12,120	2,683	27,458	2,215
1945	4,232	11,770	6,830	8,522	27,122	12,865	11,755	2,590	27,210	2,219
1946	3,462	10,025	5,790	7,622	23,437	11,305	9,831	2,315	23,451	1,902
1947	5,474	14,060	8,076	10,360	32,496	16,046	13,495	3,094	32,635	2,675
1948	3,828	10,165	6,305	7,527	23,997	11,090	10,595	2,439	24,124	1,982
1949	5,028	14,150	7,715	9,792	31,657	15,505	13,475	2,824	31,804	2,609
1950	5,446	15,241	8,652	9,915	33,808	17,045	13,809	2,932	33,786	2,777
1951	4,747	13,074	7,623	8,784	29,481	14,568	12,369	2,730	29,667	2,490
1952	6,282	18,065	10,024	12,156	40,245	20,121	16,798	3,515	40,434	3,364
1953	3,353	9,415	5,785	7,506	22,706	10,115	10,092	2,431	22,638	1,875
1954	2,679	7,600	3,957	6,336	17,893	7,940	8,173	1,945	18,058	1,495
1955	2,784	7,670	3,897	6,438	18,005	7,695	8,397	2,085	18,177	1,493
1956	4,047	10,060	5,338	6,983	22,381	11,035	9,055	2,265	22,355	1,817
1957	5,870	14,330	7,531	10,016	31,877	15,542	13,766	2,890	32,198	2,696
1958	4,105	9,949	5,894	7,541	23,384	11,234	10,066	2,292	23,592	1,916
1959	2,937	7,591	4,355	6,290	18,236	8,029	8,504	1,923	18,456	1,545
1960	2,975	7,353	3,976	6,145	17,474	7,855	7,839	1,872	17,566	1,474
1961	2,298	6,534	3,290	5,334	15,158	6,509	7,000	1,744	15,253	1,270
Total	87,143	236,217	133,795	176,655	546,667	255,886	239,439	54,308	549,633	45,261
Mean	4,150	11,248	6,371	8,412	26,032	12,185	11,402	2,586	26,173	2,155

Table 24

(Units: 1,000) Dissolved constituent loads of Green River at Green River, Utah

Calendar year	Mean discharge (a.f.)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Total Ca+Mg +Na	Bicarbonate HCO_3	Sulfate SO_4	Chloride Cl	Total HCO_3 + SO_4+CL	TDS (tons)
		Ionic loads in equivalents per million times flow in acre-feet								
1941	4,608	14,972	9,724	14,077	38,773	14,929	20,036	4,170	39,135	3,272
1942	4,622	14,163	8,932	12,426	35,521	14,356	17,914	3,709	35,979	2,989
1943	4,294	12,357	7,761	10,432	30,550	13,007	15,034	2,982	31,023	2,565
1944	4,416	13,175	7,691	11,168	32,034	14,009	15,387	2,923	32,319	2,581
1945	4,260	13,171	7,941	9,996	31,108	14,291	14,449	2,721	31,461	2,558
1946	3,519	10,939	6,515	8,714	26,168	12,289	11,765	2,419	26,473	2,148
1947	5,523	15,439	9,124	11,906	36,469	17,335	16,343	3,255	36,933	2,991
1948	3,929	11,272	7,313	8,939	27,524	12,167	13,060	2,626	27,853	2,271
1949	5,129	15,780	9,119	11,988	36,887	17,322	16,939	3,000	37,261	3,039
1950	5,476	17,081	10,127	12,233	39,441	19,401	17,294	3,199	39,894	3,223
1951	4,739	14,573	8,778	10,645	33,996	15,783	15,689	2,905	34,377	2,848
1952	6,711	21,424	12,656	15,950	50,030	23,620	22,601	3,960	50,181	4,173
1953	3,333	10,547	6,960	8,976	26,483	11,067	12,938	2,547	26,552	2,224
1954	2,639	8,744	4,822	7,807	21,373	8,715	10,812	2,080	21,607	1,807
1955	2,790	8,618	4,520	7,475	20,613	8,444	10,273	2,210	20,927	1,733
1956	4,021	10,766	5,918	7,886	24,570	11,678	10,701	2,333	24,712	2,045
1957	5,808	15,740	8,964	11,999	36,703	16,779	17,043	3,092	36,914	3,060
1958	4,211	11,584	7,412	9,831	28,827	12,669	13,656	2,491	28,816	2,421
1959	2,885	8,444	5,085	7,829	21,358	8,705	10,740	2,088	21,533	1,803
1960	2,863	7,937	4,288	6,889	19,114	8,134	9,145	1,922	19,201	1,645
1961	2,265	7,229	3,761	6,072	17,062	6,875	8,611	1,822	17,308	1,450
Total	88,041	263,955	157,411	213,238	634,604	281,575	300,430	58,454	640,459	52,846
Mean	4,192	12,569	7,496	10,154	30,219	13,408	14,306	2,784	30,498	2,516

Table 25

(Units: 10) Dissolved constituent loads of San Rafael River near Green River, Utah

Calendar year	Mean discharge (a.f.)	Ionic loads in equivalents per million times flow in acre-feet								TDS (tons)
		Culcium (Ca)	Magnesium (Mg)	Sodium (Na)	Total Ca+Mg +Na	Bicarbonate HCO_3	Sulfate SO_4	Chloride Cl	Total HCO_3 + SO_4+CL	
1941	13,910	98,914	89,187	105,213	293,314	58,517	239,314	9,467	307,298	26,806
1942	13,681	100,898	91,612	121,880	314,390	59,170	251,030	10,322	320,522	28,646
1943	7,260	69,198	67,404	94,291	230,893	33,523	190,727	8,029	232,279	21,295
1944	14,879	99,799	86,662	109,433	295,894	61,690	231,937	9,388	303,015	26,337
1945	8,529	75,296	69,731	96,165	241,192	37,635	195,998	7,915	241,548	21,400
1946	6,945	65,855	64,597	89,296	219,748	32,120	182,372	7,455	221,947	21,753
1947	11,043	106,175	91,317	144,179	341,671	47,507	280,781	11,071	339,359	28,686
1948	6,223	57,693	52,872	75,940	186,505	27,669	153,893	6,350	187,912	16,518
1949	13,466	105,436	97,176	111,041	313,653	57,867	247,292	9,980	315,139	27,423
1950	5,265	53,279	55,249	80,495	189,023	25,084	159,521	6,515	191,122	17,079
1951	7,446	68,157	67,612	99,435	235,204	33,544	194,723	7,270	235,537	20,743
1952	31,351	176,969	163,603	204,421	544,993	129,901	397,797	17,726	545,424	46,746
1953	8,060	77,036	80,272	110,625	267,933	37,552	220,009	9,196	266,757	23,461
1954	3,633	45,223	43,882	65,060	154,165	17,463	132,298	5,500	155,261	13,717
1955	2,891	33,687	32,903	46,823	113,413	13,942	95,746	4,377	114,065	10,057
1956	3,263	28,885	29,478	40,414	98,777	14,461	80,993	4,591	100,045	8,699
1957	18,947	136,948	101,867	140,548	379,363	72,063	297,282	12,097	381,442	33,107
1958	17,201	95,316	88,120	108,852	292,288	68,942	217,468	11,158	297,568	25,220
1959	2,023	25,875	56,131	39,718	121,724	9,653	79,624	3,239	92,516	8,181
1960	4,567	42,114	37,393	55,445	134,952	18,940	112,879	4,643	136,462	11,999
1961	4,815	71,786	39,316	59,860	170,962	17,941	151,030	5,407	174,379	15,678
Total	205,395	1,634,539	1,506,384	1,999,134	5,140,057	875,184	4,112,715	171,696	5,159,597	453,551
Mean	9,781	77,835	71,733	95,197	244,765	41,675	195,844	8,176	245,695	21,598

Table 26

(Units: 1,000) Dissolved constituent loads of Colorado River near Cameo, Colorado

Calendar year	Mean discharge (a.f.)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Total Ca+Mg +Na	Bicarbonate HCO_3	Sulfate SO_4	Chloride Cl	Total HCO_3 + SO_4+CL	TDS (tons)
		Ionic loads in equivalents per million times flow in acre-feet								
1941	3,073	8,110	3,167	9,239	20,516	6,538	6,028	8,105	20,671	1,683
1942	3,489	8,954	3,558	10,300	22,812	7,501	6,603	8,972	23,076	1,870
1943	2,946	7,361	2,911	8,287	18,559	6,194	5,418	7,118	18,730	1,521
1944	2,680	7,013	2,631	7,828	17,472	6,172	5,059	6,621	17,852	1,415
1945	3,028	7,649	3,798	7,415	18,862	6,941	5,562	6,537	19,040	1,521
1946	2,554	6,604	2,829	7,673	17,106	5,631	4,882	6,695	17,208	1,384
1947	3,807	8,859	3,374	8,067	20,300	7,947	5,696	6,837	20,480	1,641
1948	3,225	8,093	3,462	8,152	19,707	6,812	5,983	7,140	19,935	1,604
1949	3,368	8,750	3,314	8,474	20,538	7,904	5,807	6,774	20,485	1,666
1950	2,515	7,063	3,008	8,070	18,141	6,120	5,424	6,874	18,418	1,481
1951	2,946	7,332	3,181	7,567	18,080	6,099	5,181	7,033	18,313	1,525
1952	4,134	11,280	4,452	9,258	24,990	10,526	7,070	7,625	25,221	2,051
1953	2,530	7,377	2,432	8,050	17,859	5,976	5,130	6,841	17,947	1,503
1954	1,565	5,880	1,995	7,860	15,735	4,403	4,805	6,585	15,793	1,303
1955	1,946	6,747	2,034	7,591	16,372	5,135	4,749	6,506	16,390	1,358
1956	2,392	6,924	2,545	7,288	16,757	5,462	4,929	6,417	16,808	1,399
1957	4,325	10,832	3,466	9,040	23,338	9,575	6,187	7,505	23,267	1,966
1958	2,822	7,486	2,749	8,203	18,438	6,589	5,222	6,789	18,600	1,543
1959	2,261	6,307	2,748	7,489	16,544	5,226	4,976	6,611	16,813	1,380
1960	2,414	6,821	2,447	7,431	16,699	5,376	5,020	6,585	16,981	1,408
1961	2,034	6,139	2,358	7,035	15,532	4,668	4,571	6,451	15,690	1,298
Total	60,054	161,581	62,459	170,317	394,357	136,795	114,302	146,621	397,718	32,520
Mean	2,860	7,694	2,974	8,110	18,779	6,514	5,443	6,982	18,939	1,549

Table 27

(Units: 1,000) Dissolved constituent loads of Gunnison River near Grand Junction, Colorado

Calendar year	Mean discharge (a.f.)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Total Ca+Mg +Na	Bicarbonate HCO_3	Sulfate SO_4	Chloride Cl	Total HCO_3 + SO_4+CL	TDS (tons)
		Ionic loads in equivalents per million times flow in acre-feet								
1941	2,492	10,454	6,291	6,300	23,045	6,303	16,095	685	23,083	2,072
1942	2,673	10,876	6,218	6,168	23,262	6,368	16,219	736	23,323	2,057
1943	1,786	8,165	4,824	4,920	17,909	4,689	12,717	546	17,952	1,577
1944	2,225	8,523	4,768	4,948	18,239	5,456	12,317	499	18,272	1,543
1945	1,819	7,665	4,672	4,935	17,272	4,726	11,971	612	17,309	1,499
1946	1,261	6,619	4,088	4,576	15,283	3,804	11,099	483	15,386	1,334
1947	1,937	8,220	4,938	5,293	18,451	5,113	12,910	528	18,551	1,604
1948	2,362	8,728	5,036	5,156	18,920	5,708	12,629	666	19,003	1,645
1949	2,120	8,669	4,712	5,037	18,418	5,788	12,410	478	18,676	1,601
1950	1,335	6,574	4,047	4,110	14,731	3,653	10,643	410	14,706	1,318
1951	1,136	6,011	3,583	3,800	13,394	3,219	9,747	373	13,339	1,165
1952	2,674	10,123	5,452	5,105	20,680	6,880	13,249	556	20,685	1,782
1953	1,312	6.872	3,996	4,259	15,127	3,663	10,985	424	15,072	1,340
1954	645	5,012	2,759	3,429	11,200	2,126	8,785	327	11,238	1,060
1955	1,016	5,882	2,903	3,495	12,280	2,816	9,076	412	12,304	1,150
1956	1,100	5,415	2,959	3,274	11,648	2,895	8,450	331	11,676	1,084
1957	3,380	11,884	5,218	5,630	22,732	8,253	13,876	803	22,932	2,062
1958	2,261	8,480	4,408	4,565	17,453	5,590	11,490	514	17,594	1,612
1959	981	5,807	3,409	3,639	12,855	3,004	9,654	359	13,017	1,172
1960	1,332	6,317	3,323	3,504	13,144	3,611	9,383	315	13,309	1,167
1961	1,105	6,358	3,177	3,542	13,077	3,256	9,605	340	13,201	1,169
Total	36,952	162,654	90,781	95,685	349,120	96,921	243,310	10,387	350,628	31,013
Mean	1,760	7,745	4,323	4,556	16,625	4,615	11,586	495	16,696	1,477

Table 28

(Units:1,000) Dissolved constituent loads of Colorado River nr.Cisco, Utah

Calendar year	Mean discharge (a.f.)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Total Ca+Mg +Na	Bicarbonate HCO_3	Sulfate SO_4	Chloride Cl	Total HCO_3 + SO_4+CL	TDS (tons)
		Ionic loads in equivalents per million times flow in acre-feet								
1941	7,066	25,341	15,930	24,416	65,687	17,540	37,445	10,918	65,903	5,652
1942	7,099	24,930	15,486	23,604	64,020	17,250	35,793	10,833	63,876	5,486
1943	5,214	20,068	12,662	19,802	52,532	13,491	29,872	9,095	52,458	4,498
1944	5,840	21,885	11,726	18,883	52,494	15,821	27,165	9,679	52,665	4,336
1945	5,505	20,195	11,759	18,310	50,264	15,061	25,777	9,701	50,539	4,210
1946	4,058	17,265	10,341	15,911	43,517	11,688	24,332	7,792	43,812	3,680
1947	6,259	23,168	12,142	19,214	54,524	16,165	28,616	10,038	54,819	4,588
1948	6,291	23,710	12,651	19,499	55,860	17,661	27,347	10,903	55,911	4,638
1949	6,337	23,450	12,885	20,931	57,266	17,276	28,341	11,712	57,329	4,780
1950	4,074	17,201	10,642	16,973	44,816	11,253	24,032	9,933	45,218	3,823
1951	3,987	16,422	10,016	16,303	42,741	10,283	23,006	9,478	42,767	3,758
1952	7,719	24,943	13,451	19,760	58,154	18,870	28,129	10,946	57,945	5,064
1953	4,061	17,077	10,527	18,106	45,710	10,532	24,431	10,804	45,767	3,943
1954	2,293	13,834	8,998	16,003	38,835	6,996	22,085	9,524	38,605	3,300
1955	3,186	15,404	9,121	15,759	40,284	8,397	21,781	9,943	40,121	3,421
1956	3,568	15,909	9,018	15,411	40,338	9,078	21,549	9,472	40,099	3,428
1957	8,889	30,590	13,113	22,535	66,238	21,213	31,758	13,526	66,497	5,602
1958	6,044	20,785	11,061	18,966	50,812	13,933	26,009	11,451	51,393	4,348
1959	3,215	15,752	8,968	16,109	40,829	8,808	22,586	9,528	40,922	3,481
1960	4,004	16,685	9,040	15,166	40,891	9,688	22,201	8,975	40,864	3,496
1961	3,395	17,441	8,326	15,666	41,433	8,806	23,194	9,357	41,357	3,555
Total	108,104	422,055	237,863	387,327	1,047,245	279,810	555,449	213,608	1,048,867	89,087
Mean	5,148	20,098	11,327	18,444	49,869	13,324	26,450	10,172	49,946	4,242

(Units: 10) Dissolved constituent loads of San Juan River near Archuleta, New Mexico

Table 29

Calendar year	Mean discharge (a.f.)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Total Ca+Mg +Na	Bicarbonate HCO_3	Sulfate SO_4	Chloride Cl	Total HCO_3 + SO_4+CL	TDS (tons)
		Ionic loads in equivalents per million times flow in acre-feet								
1941	257,370	318,615	92,888	117,112	528,615	361,267	162,945	15,663	539,875	42,446
1942	136,590	183,901	60,256	75,923	320,080	210,557	108,022	10,350	328,929	27,362
1943	81,820	121,742	40,220	56,574	218,536	137,329	77,354	7,773	222,456	18,333
1944	125,130	152,764	48,117	64,137	265,018	181,307	84,477	9,847	275,631	23,209
1945	89,250	119,952	39,315	54,272	213,539	139,113	72,288	8,169	219,570	18,694
1946	45,640	74,681	25,867	46,734	147,282	84,401	59,526	5,208	149,135	12,644
1947	75,980	105,712	34,515	55,677	195,904	125,977	68,178	6,176	200,331	16,647
1948	120,300	148,589	47,978	62,183	258,750	170,586	79,071	10,186	259,843	22,027
1949	141,990	187,112	62,285	69,799	319,196	204,772	102,617	15,346	322,735	27,449
1950	56,420	87,298	30,319	42,839	160,456	93,753	63,534	5,751	163,038	13,823
1951	41,270	69,404	22,105	41,029	132,538	77,464	53,474	4,876	135,814	11,650
1952	155,240	213,105	71,190	72,993	357,288	228,330	124,260	11,746	364,336	32,164
1953	56,310	90,461	30,405	48,407	169,273	99,367	66,772	6,212	172,351	14,929
1954	54,540	92,719	25,274	44,810	162,803	98,987	61,348	5,957	166,292	14,962
1955	53,693	84,525	26,443	40,511	151,479	98,485	50,204	7,408	156,097	13,177
1956	53,890	76,119	25,676	35,134	136,929	87,704	46,697	6,865	141,266	12,319
1957	164,700	236,591	67,841	96,736	401,168	273,208	126,095	16,838	416,141	33,033
1958	133,200	204,877	69,737	74.173	348,787	229,054	109,470	9,773	348,297	31,315
1959	43,630	78,127	19,213	39,129	136,469	80,417	49,282	6,607	136,306	11,864
1960	102,885	149,043	35,207	64,517	248,767	156,018	88,748	9,709	254,475	23,066
1961	74,993	113,828	29,634	51,989	195,451	120,353	69,926	7,239	197,518	17,608
Sum	2,064,841	2,909,165	904,485	1,254,678	5,068,328	3,258,449	1,724,288	187,699	5,170,436	438,721
Mean	98,326	138,532	43,071	59,746	241,349	155,164	82,109	8,938	246,211	20,891

Table 30

(Units: 1,000) Dissolved constituent. loads of San Juan River near Bluff, Utah

Calendar year	Mean discharge (a.f.)	Ionic loads in equivalents per million times flow in acre-feet: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Total Ca+Mg +Na	Bicarbonate HCO_3	Sulfate SO_4	Chloride Cl	Total HCO_3 + SO_4+CL	TDS (tons)
1941	4,898	16,305	5,548	8,678	30,531	13,010	16,454	1,217	30,681	2,624
1942	2,247	7,286	3,083	3,579	13,948	5,789	7,600	634	14,023	1,185
1943	1,493	5,785	2,336	3,121	11,242	4,126	6,584	619	11,329	959
1944	2,291	7,235	2,533	3,176	12,944	5,741	6,697	626	13,064	1,101
1945	1,589	5,619	2,248	3,157	11,024	4,373	6,120	589	11,082	936
1946	887	3,887	1,614	2,419	7,920	2,568	4,933	433	7,934	681
1947	1,677	6,361	2,273	3,919	12,553	4,340	7,720	575	12,635	1,087
1948	2,141	6,253	2,059	3,179	11,491	4,938	6,033	559	11,530	977
1949	2,487	7,436	2,806	3,616	13,858	5,803	7,474	601	13,878	1,169
1950	854	3,264	1,520	1,885	6,669	2,128	4,200	387	6,715	579
1951	691	2,944	1,252	1,926	6,122	1,820	3,952	380	6,152	544
1952	2,554	7,244	2,506	3,436	13,186	5,678	7,080	652	13,410	1,156
1953	968	3,812	1,523	2,523	7,858	2,412	5,012	446	7,870	702
1954	1,011	4,296	1,669	2,903	8,868	2,816	5,592	498	8,906	779
1955	911	3,615	1,339	2,532	7,486	2,418	4,690	428	7,536	668
1956	840	2,962	1,130	1,934	6,026	1,963	3,695	373	6,031	537
1957	2,908	9,019	3,293	4,943	17,255	6,568	9,417	910	16,895	1,498
1958	2,296	6,586	2,499	3,475	12,560	4,930	7,100	739	12,769	1,116
1959	711	2,990	1,149	2,293	6,432	1,822	4,188	479	6,489	577
1960	1,608	4,735	1,681	3,149	9,565	3,455	5,588	617	9,660	848
1961	1,264	4,689	1,701	3,046	9,436	3,038	5,778	650	9,460	836
Total	36,327	122,323	45,762	68,889	236,974	89,736	135,907	12,412	238,055	20,559
Mean	1,730	5,825	2,179	3,280	11,284	4,273	6,472	591	11,336	979

Table 31

(Units: 1,000) Dissolved constituent loads of Colorado River at Lees Ferry, Arizona

Calendar year	Mean discharge (a.f.)	Ionic loads in equivalents per million times flow in acre-feet: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Total Ca+Mg +Na	Bicarbonate HCO_3	Sulfate SO_4	Chloride Cl	Total HCO_3 + SO_4+CL	TDS (tons)
1941	17,856	66,828	35,221	43,410	145,459	49,645	84,151	17,289	151,085	12,481
1942	14,793	44,904	28,322	33,606	106,832	37,281	61,062	13,557	111,900	9,381
1943	11,414	38,059	23,890	35,438	97,387	28,213	54,329	15,127	97,669	8,375
1944	13,019	39,236	24,286	36,788	100,310	30,607	53,944	15,572	100,123	8,525
1945	11,768	41,235	23,643	34,607	99,485	31,729	52,186	15,963	99,878	8,501
1946	8,751	38,181	20,981	28,251	87,413	27,997	46,787	14,152	88,936	7,346
1947	14,046	52,257	27,528	35,129	114,914	40,042	60,283	14,383	114,708	9,513
1948	12,885	44,309	23,349	34,658	102,316	35,221	51,629	15,173	102,023	8,531
1949	14,604	52,207	27,565	39,667	119,439	42,017	60,084	17,008	119,109	9,954
1950	10,801	39,740	23,551	33,089	96,380	31,667	50,938	14,517	97,122	8,098
1951	9,900	39,694	21,971	31,024	92,689	30,137	49,052	14,144	93,333	7,833
1952	17,904	59,653	31,638	44,736	136,027	51,255	67,187	17,525	135,967	11,396
1953	8,730	35,717	20,852	31,804	88,373	26,173	48,231	14,411	88,815	7,487
1954	6,164	30,661	15,828	28,373	74,862	20,778	41,883	12,666	75,327	6,385
1955	6,966	33,031	16,963	27,626	77,620	23,745	40,648	12,829	77,222	6,548
1956	8,659	34,920	17,063	26,046	78,029	27,157	37,823	12,692	77,672	6,514
1957	18,702	73,991	29,875	42,103	145,969	60,282	67,267	18,152	145,701	12,646
1958	13,141	52,122	22,008	34,093	108,223	42,354	51,370	15,761	109,485	9,280
1959	7,061	32,289	15,509	27,969	75,767	21,509	40,039	12,769	74,317	6,766
1960	8,790	36,873	14,512	27,488	78,873	26,071	39,601	12,112	77,784	7,092
1961	7,316	36,843	15,086	27,614	79,543	22,208	43,024	13,209	78,441	7,069
Total	243,270	922,750	479,641	703,519	2,105,910	706,088	1,101,518	309,011	2,116,617	179,721
Mean	11,584	43,940	22,840	33,501	100,281	33,623	52,453	14,715	100,791	8,558

Table 32

(Units 1000 except cfs) Dissolved Constituent Loads of Green River at Green River, Utah

	Mean discharge (cfs)	Mean discharge (a.f.)	Ionic loads in equivalents per million times flow in acre-feet: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Total Ca + Mg + Na	Bicarbonate HCO_3	Sulfate SO_4	Chloride Cl	Total HCO_3 + SO_4+Cl	Dissolved solids (tons)
Oct.	1898	117	436	364	574	1374	413	780	191	1384	116
Nov.	2275	135	533	435	619	1586	514	879	195	1588	133
Dec.	1265	78	357	288	403	1047	342	572	136	1051	86
Year 1933											
Jan.	1455	89	374	272	362	1009	365	508	136	1009	82
Feb.	1678	93	367	276	390	1032	363	529	144	1036	85
Mar.	3095	190	711	594	910	2215	638	1298	274	2210	187
Apr.	4505	268	922	684	1037	2643	874	1477	311	2662	223
May	10770	662	1682	1033	1384	4099	1974	1748	358	4079	331
June	23030	1370	2672	1124	1137	4933	3015	1480	329	4824	397
July	5426	334	930	494	727	2152	857	1068	217	2142	180
Aug.	1752	108	365	256	403	1024	346	562	130	1039	87
Sept.	1345	80	315	231	376	921	264	546	124	934	78
Total		3524	9662	6049	8322	24034	9964	11447	2545	23957	1985
Oct.	1232	76	271	230	373	874	247	496	130	873	73
Nov.	1486	88	343	305	470	1118	333	630	157	1121	94
Dec.	1392	86	371	317	472	1160	354	657	152	1163	98
Year 1934											
Jan.	1625	100	428	370	535	1332	417	739	172	1328	111
Feb.	2149	119	470	393	597	1459	449	825	189	1462	123
Mar.	2155	133	482	403	640	1525	472	871	205	1548	130
Apr.	2927	174	494	343	545	1382	505	704	197	1406	117
May	4632	285	555	282	459	1295	629	510	160	1299	108
June	2128	127	272	156	237	664	309	274	82	665	54
July	645	40	114	85	148	347	131	168	46	345	29
Aug.	712	44	144	108	227	478	162	246	74	482	40
Sept.	603	36	139	94	175	408	124	220	67	410	34
Total		1306	4083	3085	4876	12045	4132	6339	1631	12103	1010

Colorado River Basin
Flow and Quality of Water Records
1941-61

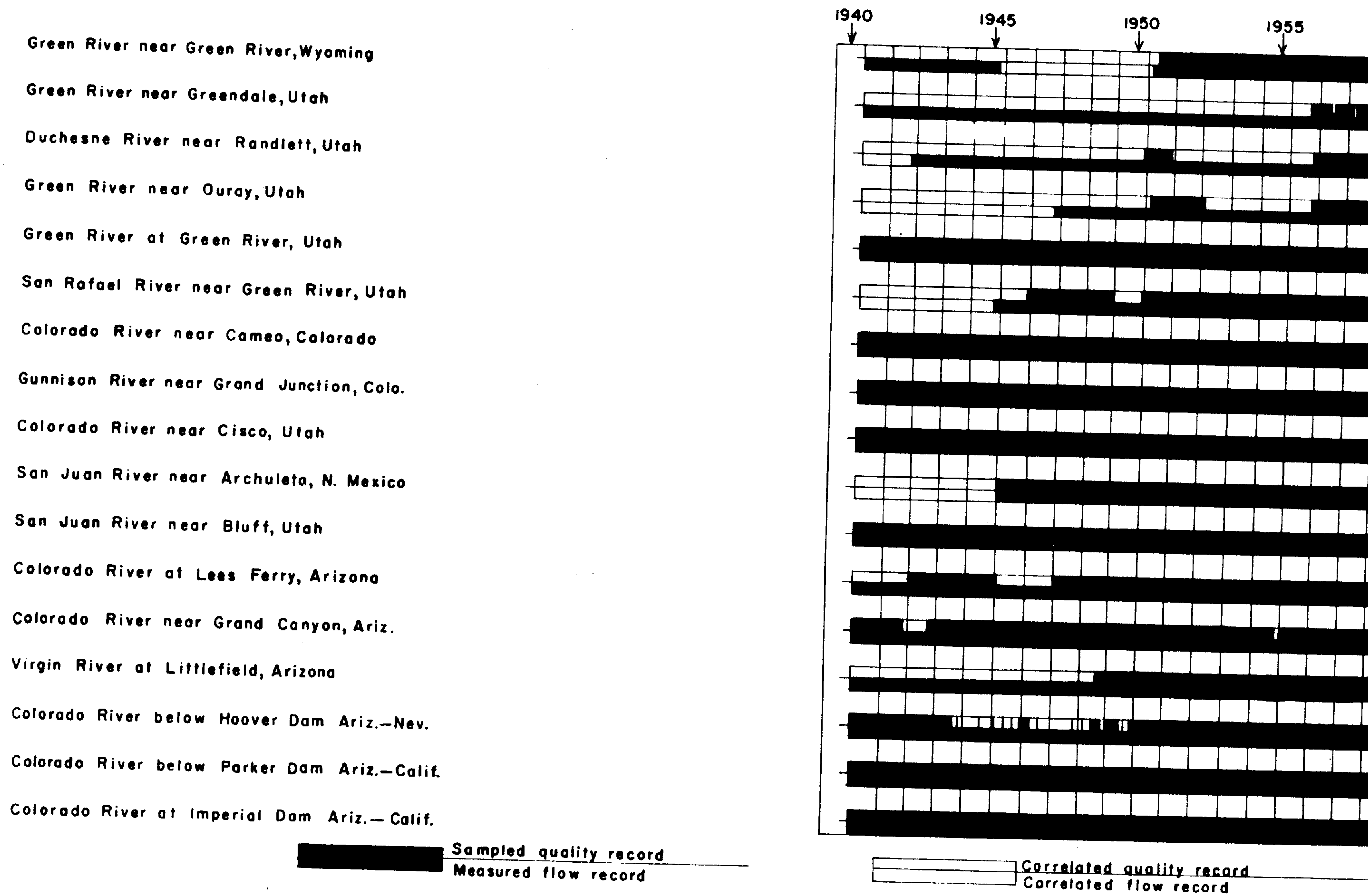
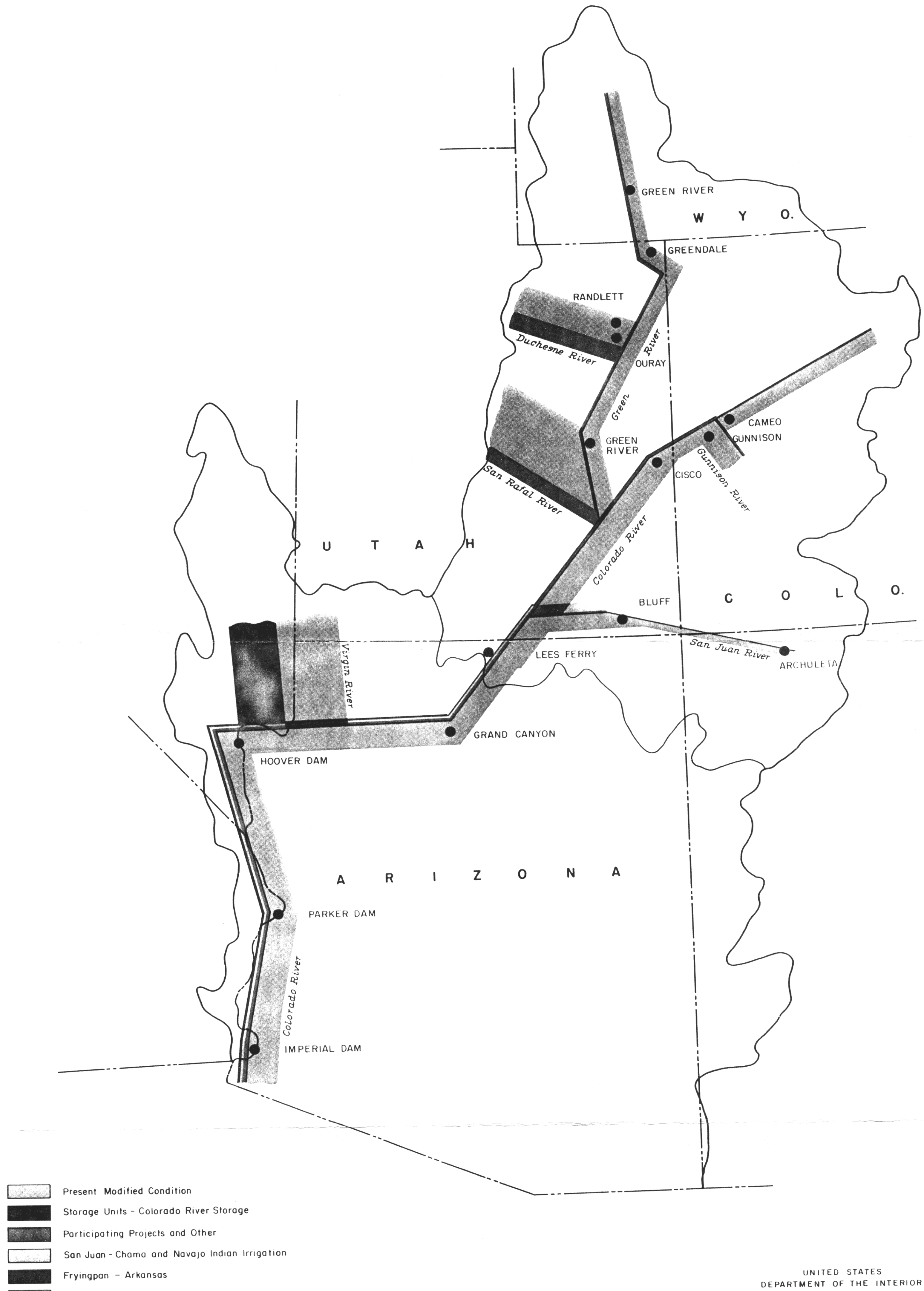


Fig.1



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLORADO RIVER BASIN

QUALITY OF WATER MAP

CONCENTRATION - TONS PER ACRE FOOT

65 - 400 - 72

JULY 14, 1964

FIGURE 2